PrepBox

Subject: 9 Math

Curriculum: Canadian Curriculum

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Chapter 1 Rational Numbers

1.1 Adding Mixed Fractions

Question 1: Add.

$\frac{8}{5} + \frac{11}{6}$

Lecture Video <

Solution Video

Question 2: Add.

$\frac{1}{2} + \frac{2}{3} + \frac{3}{4}$

Lecture Video <

Solution Video

Question 3: Add.

$$\frac{7}{10} + \frac{4}{6}$$

Lecture Video <

Solution Video

Question 4: Add the following.

$$\frac{1}{15} + \frac{1}{12}$$

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Solution Video

Question 5: Describe a situation in which you might add $\frac{1}{3} + \frac{1}{4} + \frac{1}{2}$.

Lecture Video <

Solution Video

Question 6: Evaluate.

$(a)\ 4\frac{1}{2} + 8\frac{1}{6}$ $(c)\ 4\frac{1}{3} + 12\frac{5}{8}$ $(e)\ 34\frac{7}{10} + 16\frac{3}{4}$
$(b)\ 3\frac{3}{4} + 6\frac{1}{5}$ $(d)\ 1\frac{4}{5} + 6\frac{2}{3}$ $(f)\ 11\frac{1}{2} + 41\frac{3}{5}$

Lecture Video <

Solution Video

Question 7: Determine two mixed numbers, with different denominators, that have the following properties.

a sum of $3\frac{4}{5}$

Lecture Video <

Solution Video

Question 8: Which of the following is the right steps to show the work for below:

Why is $3\frac{2}{5} - 1\frac{4}{7}$ the same as $\frac{3}{7} + 1\frac{2}{5}$?

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Question 9: Recalculate $3\frac{1}{4} - 1\frac{1}{2}$ by following the steps below.

i. Find the difference between the whole parts.

ii. Subtract the fraction in the first mixed number from the fraction in the second mixed number.

iii. Subtract the answer in part (ii) from the answer in part (i).

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Question 10: The sum of two mixed numbers is $2\frac{1}{2}$ more than the difference. What are the two numbers?

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Solution Video

Question 11: Subtract.

$$5\frac{5}{7} - 1\frac{2}{7}$$

Lecture Video <

Solution Video

Question 12: Subtract the following improper fractions in the fewest steps possible. Reduce your final answer.

$$12\frac{14}{13} - 3\frac{5}{3} =$$

Lecture Video <

Solution Video

Question 13: Subtract the following improper fractions in the fewest steps possible. Reduce your final answer.

$$5\frac{21}{5} - \frac{21}{3} =$$

Lecture Video <

Solution Video

Question 14: Evaluate.

$$(a) \quad \tfrac{3}{5} + 1\tfrac{2}{7} \qquad (b) \quad \tfrac{3}{11} - 1\tfrac{1}{9}$$

Lecture Video <

Solution Video

Question 15: Calculate.

$$9\frac{1}{7} - 4\frac{4}{5}$$

Lecture Video <

Solution Video

Question 16: Find each difference.

$2\frac{2}{3} - 7\frac{1}{3}$

Lecture Video <

Solution Video

Question 17: Evaluate.

a) $8\frac{1}{4} - 2\frac{1}{2}$

b) $4\frac{7}{8} - 3\frac{8}{9}$

Lecture Video <

Solution Video

Question 18: Calculate without using a calculator.

$5\frac{5}{6} - 3\frac{3}{4}$

Lecture Video <

Solution Video

Question 19: Calculate.

$$\frac{38}{5} - 3\frac{1}{2}$$

Lecture Video <

Solution Video

Question 20: Which of the following is the right steps to show the work for below:

Why is $3\frac{2}{3} - 1\frac{5}{6}$ the same as $3\frac{5}{6} - 2$?

Lecture Video <

Solution Video

Question 21: Evaluate.

a) $3\frac{1}{2} - 1\frac{1}{5}$

b) $7\frac{3}{4} - 6\frac{1}{3}$

Lecture Video <

Solution Video

Question 22: Draw a model to show each calculation. Then determine the sum or difference.

a) $\frac{3}{4} + \frac{5}{6}$

b) $\frac{3}{8} - \frac{1}{6}$

Lecture Video <

Solution Video

Question 23: Mei used a number line to model each calculation. Explain how you know that her model is correct.

$2\frac{1}{3} + 3\frac{1}{6} = 5\frac{1}{2}$

Lecture Video <

Solution Video

Question 24: Use fraction strips to to evaluate each expression. What is the value of each expression?

$9\frac{1}{8} - 6\frac{3}{4}$

Lecture Video <

Solution Video

Question 25: Use number lines to evaluate the following expressions.

$$7\frac{3}{8} + 4\frac{1}{8}$$

Lecture Video <

Solution Video

Question 26: Use number lines to evaluate the following mixed fractions.

$$7\frac{3}{8} - 4\frac{1}{8}$$

Lecture Video <

Solution Video

Question 27: Use number lines to evaluate the mixed fractions.

$$6\frac{3}{8} + 5\frac{2}{3}$$

Lecture Video <

Solution Video

Question 28: Use number lines to evaluate the following expressions.

$$3\frac{2}{5} - 1\frac{4}{5}$$

Lecture Video <

Solution Video

Question 29: Between which two whole numbers will leach sum lie?

$$4\frac{1}{2} + 8\frac{1}{6}$$

Lecture Video <

Solution Video

Question 30: Between which two whole numbers will leach sum lie?

$$3\frac{3}{4} + 6\frac{1}{5}$$

Lecture Video <

Solution Video

Question 31: Between which two whole numbers will leach sum lie?

$$4\frac{1}{3} + 12\frac{5}{8}$$

Lecture Video

Solution Video

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Question 32: Between which two whole numbers will leach sum lie?

$$1\frac{4}{5} + 6\frac{2}{3}$$

Lecture Video

Solution Video

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Question 33: Between which two whole numbers will leach sum lie?

$$34\frac{7}{10} + 16\frac{3}{4}$$

Lecture Video

Solution Video

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Question 34: Between which two whole numbers will leach sum lie?

$$11\frac{1}{2} + 41\frac{3}{5}$$

Lecture Video <

Solution Video

Question 35: About $\frac{2}{5}$ of the students in a school were invited to participate in a special Videoconferencing program. Only $\frac{1}{3}$ of these students brought in their permlssion forms by the first day of the program. What fraction of the students were permitted to participate in the first day of the program?

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Solution Video

Question 36: Jasleen goes to bed 3 h after dinner. Yesterday, she spent $1\frac{1}{2}$ h on her homework and $\frac{2}{3}$ h on the telephone after dinner. How much time did she have left before bedtime?

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Solution Video

Question 37: A pitcher of juice is half empty. After $\frac{1}{2}$ cup of juice is added, the pitcher is $\frac{3}{4}$ full. How much juice does the pitcher hold when it is full? Show your thinking.

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Solution Video

Question 38: Which of these differences is greater than $\frac{1}{2}$? How do you know?

i) $\frac{5}{6} - \frac{2}{3}$

ii) $\frac{5}{6} - \frac{1}{2}$

iii) $\frac{5}{6} - \frac{1}{6}$

b) Explain how you found your answers in part a. Which other way can you find the fractions with a difference greater than $\frac{1}{2}$ Explain.

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Solution Video

Question 39: There are $3\frac{3}{4}$ c of flour, $1\frac{1}{2}$ c of sugar, $\frac{2}{3}$ c of brown sugar, and $\frac{1}{4}$c of oil in a cake mix. How many cups of ingredients are there in all?

A $4\frac{1}{2}$c

C $5\frac{1}{2}$c

B $5\frac{1}{6}$c

D $6\frac{1}{6}$c

Lecture Video <

Solution Video

Question 40: Franca is training to become a hospital aide. The first training session she attends is $3\frac{1}{2}$ days long. The second session is $1\frac{3}{4}$ days long. How long, in total is her training?

Lecture Video <

Solution Video

Question 41: A jug holds 2 cups of liquid. A recipe for punch is $\frac{1}{2}$cup of orange juice, $\frac{1}{4}$ cup of raspberry juice, $\frac{3}{8}$ cup of grapefruit juice, and $\frac{5}{8}$ cup of lemonade. Is the jug big enough for punch? Explain.

Lecture Video <

Solution Video

Question 42: Kelly had $\frac{3}{4}$ of a tank of gas at the beginning of the week. At the end of the of the week, Kelly had $\frac{1}{8}$ of a tank left.

a) Did Kelly use more of less than $\frac{1}{2}$ of a tank? Explain.

b) How much more or less than $\frac{1}{2}$ of a tank did Kelly use?

Lecture Video <

Solution Video

Question 43: Two students, George and Mason, worked on a project.

George worked for $3\frac{2}{3}$h.

Mason worked for $2\frac{4}{5}$h

What was the total time spent on the project?

Lecture Video

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Solution Video

Question 44: Five friends shared two pizzas. Fran ate $\frac{1}{3}$ of a pizza, Abdul ate $\frac{3}{8}$ of a pizza, Hannah ate $\frac{1}{4}$ of a pizza, and Siva ate $\frac{1}{2}$ of a pizza. What fraction of the pizza remains for Brad?

Lecture Video

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Solution Video

1.2 Multiplying and Dividing Fractions

Question 1: Draw each rectangle on grid paper. Use the rectangle to find each product.

$\frac{2}{5} \times \frac{1}{2}$

Lecture Video <

Solution Video

Question 2: Multiply. Draw a picture to show each answer.

$$\frac{2}{15} \times 10$$

Lecture Video <

Solution Video

Question 3: Use fraction strip to show the following visually.

$\frac{5}{6}$ of $\frac{1}{2}$

Lecture Video <

Solution Video

Question 4: What division expression does each picture represent?

Lecture Video <

Solution Video

Question 5: Calculate.

$\frac{3}{7} \times 3\frac{1}{2}$

Lecture Video <

Solution Video

Question 6: Convert the following fractions into Improper form of the fraction.

$12\frac{1}{5} \times 1\frac{3}{5} =$

Lecture Video <

Solution Video

Question 7: Convert the following fractions into Improper form of the fraction.

$$4\frac{3}{7} \times 2\frac{2}{11} =$$

Lecture Video <

Solution Video

Question 8: Calculate each product without using any calculator.

$$\frac{3}{4} \times 6\frac{11}{12}$$

Lecture Video <

Solution Video

Question 9: Evaluate.

$$3\frac{1}{5} \cdot \frac{3}{4}$$

Lecture Video <

Solution Video

Question 10: Calculate each product without using any calculator.

$$4\frac{1}{8} \times 5\frac{1}{3}$$

Lecture Video <

Solution Video

Question 11: Multiply.

$$4\tfrac{3}{8} \times 1\tfrac{1}{4}$$

Lecture Video <

Solution Video

Question 12: Show each multiplication using a different model. Determine the product.

$$4\frac{2}{5} \times 3\frac{3}{5}$$

Lecture Video <

Solution Video

Question 13: Without using your calculator, showing your working clearly, evaluate the following:

$$\frac{4}{5} \times 3\frac{2}{3}$$

Lecture Video <

Solution Video

Question 14: Evaluate $\frac{2}{3} \div \frac{1}{4}$.

Lecture Video <

Solution Video

Question 15: Calculate.

$$\frac{1}{2} \div \frac{1}{3}$$

Lecture Video <

Solution Video

Question 16: Divide the following mixed numbers.

$$1\frac{2}{5} \div 1\frac{1}{25}$$

Lecture Video <

Solution Video

Question 17: Convert the following fractions into Improper form then divide.

$$2\frac{5}{6} \div 1\frac{1}{6}$$

Lecture Video <

Solution Video

Question 18: Convert the following fractions into Improper form then divide.

$$4\frac{3}{7} \div 2\frac{2}{21}$$

Lecture Video <

Solution Video

Question 19: Calculate each quotient.

$$9\frac{2}{3} \div 2\frac{2}{3}$$

Lecture Video <

Solution Video

Question 20: Calculate each quotient.

$$2\frac{7}{8} \div 3\frac{5}{6}$$

Lecture Video <

Solution Video

Question 21: Calculate each quotient.

$$8\frac{2}{3} \div 10\frac{1}{2}$$

Lecture Video <

Solution Video

Question 22: Calculate each quotient.

$8\frac{3}{4} \div 5\frac{2}{5}$

Lecture Video <

Solution Video

Question 23: Calculate

$1\frac{2}{3} \div 5\frac{5}{6}$

Lecture Video <

Solution Video

Question 24: Dividing a number by $5\frac{1}{2}$ give the same answers as multiplying the number by ?

Lecture Video <

Solution Video

Question 25: For **i)**, determine the number represented by the rectangle and the triangle.

Lecture Video <

Solution Video

Question 26: Determine the number represented by the rectangle and the triangle.

$4\frac{3}{4} \div 1\frac{1}{6} = \square$

$\square \times 1\frac{1}{6} = \triangle$

Lecture Video <

Solution Video

Question 27: Without calculating the quotient, how do you know that $4\frac{2}{3} \div 10\frac{1}{4}$ has to be less than $\frac{1}{2}$?

Lecture Video <

Solution Video

Question 28: Determine the value of x that makes each statement true.

$$2^x = \frac{1}{4}$$

Lecture Video <

Solution Video

Question 29: Are these two calculations equal? Show your work.

$$\frac{4}{9} \div \frac{2}{3} \text{ and } \frac{4 \div 2}{9 \div 3}$$

Lecture Video <

Solution Video

Question 30: Show that the two calculations are equivalent in each set below.

$$\frac{28}{15} \div \frac{4}{5} \text{ and } \frac{28 \div 4}{15 \div 35}$$

Lecture Video <

Solution Video

Question 31: Show that the two calculations are equivalent in each set below.

$$\frac{35}{48} \div \frac{5}{12} \text{ and } \frac{35 \div 5}{48 \div 12}$$

Lecture Video <

Solution Video

Question 32: Andrea's bedroom is $1\frac{1}{3}$ times as long as Kit's bedroom and $1\frac{2}{3}$ times as wide. What fraction of the area of Kit's bedroom is the area ofAndrea's bedroom?

Lecture Video <

Solution Video

Question 33: Eileen used to be on the phone $3\frac{1}{2}$ times as much as her sister every day. As a New Year's resolution, she decided to cut down to about $\frac{2}{5}$ of the time she used to be on the phone. About how many times as much as her sister is Eileen now on the phone?

Lecture Video <

Solution Video

Question 34: Which whole numbers, N, find N to make the product of $3\frac{1}{5}$ and $N\frac{3}{4}$ great than 25?

Lecture Video <

Solution Video

Question 35: Why does finding out how many $\frac{3}{4}$ strips fit along the length of 4 whole strips help you solve the problem?

Lecture Video <

Solution Video

Question 36: A mixed number was divided by $2\frac{3}{4}$. The quotient was a whole number larger than 10. What is possible for the mixed original number? State two possible solutions.

Lecture Video <

Solution Video

Question 37: A rectangle measuring $8\frac{1}{4}$ units by $3\frac{3}{4}$ units is to be completely covered by squares that are all the same size. What are the largest possible dimensions of the squares?

Lecture Video

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Solution Video

1.3 Integer & Powers

Question 1: Determine each quotient. Multiply to check.

$\frac{192}{-12}$

Lecture Video <

Solution Video

Question 2: Calculate.

$\frac{(-6)(6)}{-4}$

Lecture Video <

Solution Video

Question 3: Calculate

$$\frac{-4(15)}{-10}$$

Lecture Video <

Solution Video

Question 4: Use the fact that $n \times \frac{1}{n} = \frac{n}{n} = 1$, reciprocal rule to simplify the following expressions.

$$\frac{3 \times 7 \times 6}{-9 \times 14}$$

Lecture Video

Solution Video

Question 5: Find each product.

-5^2

Lecture Video

Solution Video

Question 6: Evaluate.

$(-2)^6$

Lecture Video

Solution Video

Question 7: Without calculating, state whether the answer will be positive or negative.

$-(-2)^3$

Lecture Video <

Solution Video

Question 8: Without calculating, state whether the answer will be positive or negative.

-2^4

Lecture Video <

Solution Video

Question 9: Without calculating, state whether the answer will be positive or negative.

$-(-2)^4$

Lecture Video <

Solution Video

Question 10: Without calculating, state whether the answer will be positive or negative.

$-(-2^4)$

Lecture Video <

Solution Video

Question 11: **(a)** Evaluate each power: $(-2)^2, (-2)^3, (-2)^4, (-2)^5$

(b) Examine the signs of your answers. What pattern do you notice?

(c) Explain how you can tell the sign of the answer when a power has a negative base. Create and use examples of your own to illustrate your explanation.

Lecture Video <

Solution Video

Question 12: Determine the value that makes each equation true.

$\bigcirc^3 = -27$

Lecture Video <

Solution Video

Question 13: Determine the value that makes each equation true.

$-\bigcirc^2 = -25$

Lecture Video <

Solution Video

Question 14: Determine the value that makes each equation true.

$-4^{\bigcirc} = -64$

Lecture Video <

Solution Video

Question 15: Evaluate.

-5^3

Lecture Video <

Solution Video

Question 16: Evaluate.

-4^3

Lecture Video

Solution Video

<

Question 17: Evaluate.

$-(-3)^4$

Lecture Video

Solution Video

<

Question 18: Evaluate.

$(-6)^2$

Lecture Video

Solution Video

<

Question 19: Evaluate.

$(-4)^3$

Lecture Video <

Solution Video

Question 20: Evaluate.

$-(-3)^3$

Lecture Video <

Solution Video

Question 21: Solving the equation $\bigcirc^2 = 64$ give two possible integer values. Determine all possible values.

Lecture Video <

Solution Video

Question 22: Evaluate each expression without using a calculator.

$5(-2)^3$

Lecture Video <

Solution Video

Question 23: Evaluate. Remember to use the correct order of operations.

$2^4 - 2^2 + 2^3$

Lecture Video <

Solution Video

Question 24: Evaluate each expression. Name the property used in each step.

$(2^5 - 5^2) + (4^2 - 2^4)$

Lecture Video <

Solution Video

Question 25: Evaluate.

$5^2 - 6^2 \div 2^2$

Lecture Video

Solution Video

Question 26: Evaluate each expression without using a calculator.

$-4(-5) - (-3)^3$

Lecture Video

Solution Video

Question 27: Evaluate each expression without using a calculator.

$$\frac{(-2)^2 - 22}{-3^2}$$

Lecture Video

Solution Video

Question 28: Evaluate each expression without using a calculator.

$$[-2(-1)^3]^6$$

Lecture Video <

Solution Video

Question 29: Evaluate each expression without using a calculator.

$$\frac{3^3+3(7)}{-2^4}+\frac{3(-5)^2}{-15}$$

Lecture Video <

Solution Video

Question 30: Find the error in each solution. Explain what was done incorrectly. Redo the solution, making the necessary

$$\begin{aligned}&-2(3)^2;\ \text{step 1}\\&=(-6)^2;\ \text{step 2}\\&=36;\ \text{step 3}\end{aligned}$$

Lecture Video <

Solution Video

Question 31: Both Claire and Robin calculated $5(-2) - 3(-2)$. Clare's calculations

Clare's calculations

$$\begin{aligned} &5(-2) - 3(-2) \\ &\quad = -10 + 6 \\ &\qquad = -4 \end{aligned}$$

Robin's calculations

$$\begin{aligned} &5(-2) - 3(-2);\ \text{step } 1 \\ &\quad = 2(-2);\ \text{step } 2 \\ &\qquad = -4;\ \text{step } 3 \end{aligned}$$

Both students are correct. Explain Robins' reasoning from step 1 to 2.

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Solution Video

Question 32: Find the error in each solution. Explain what was done incorrectly. Redo the solution, making the necessary

$$\begin{aligned} &-4[5 - 2(-3)];\ \text{step } 1 \\ &\ = -4[3(-3)];\ \text{step } 2 \\ &\quad = -4[-9];\ \text{step } 3 \\ &\qquad = 36;\ \text{step } 4 \end{aligned}$$

Lecture Video <

Solution Video

Question 33: Evaluate each expression when $x = -2$ and $y = -1$.

$x^2 + y^3$

Lecture Video <

Solution Video

Question 34: Evaluate each expression when $x = -2$ and $y = -1$.

$2y^5 - (3 - x)^2$

Lecture Video

Solution Video

Question 35: Evaluate each expression when $x = -2$ and $y = -1$.

$x^2 + [5x - 2(y - x)]$

Lecture Video

Solution Video

Question 36: Evaluate each expression when $x = -2$ and $y = -1$.

$5y^3(-x^4)$

Lecture Video

Solution Video

Question 37: Evaluate each expression when $x = -2$ and $y = -1$.

$$\frac{8(x+y^2)}{x^2}$$

Lecture Video <

Solution Video

Question 38: Evaluate each expression when $x = -2$ and $y = -1$.

$$\frac{y^5+y^3+y}{y^6+y^4+y^2}$$

Lecture Video <

Solution Video

Question 39: valuate the expression $-y^2 - 4x^3$ when $x = -2$ and $y = 3$.

Lecture Video <

Solution Video

Question 40: Assume b and n are positive integers. When n is an odd number, decide whether $-b^n + (-b)^n$ is positive, negative, or zero. Explain your reasoning.

Lecture Video <

Solution Video

Question 41: Assume b and n are positive integers. When n is an even number, decide whether $-b^n + (-b)^n$ is positive, negative, or zero. Explain your reasoning.

Lecture Video <

Solution Video

Question 42: Evaluate the following

$$(i)(-2)^3(-2)^4 \qquad (ii)(-2)^2(-2)^6 \qquad (iii)(-2)(-2)^5$$

Lecture Video <

Solution Video

Question 43: Evaluate the following

$(i)\frac{(-3)^9}{(-3)^7}$ $(ii)\frac{(-3)^8}{(-3)^4}$ $(iii)\frac{(-3)^5}{(-3)}$

Lecture Video <

Solution Video

Question 44: Determine the value that makes each equation true.

$\bigcirc^5 = 32$

Lecture Video <

Solution Video

Question 45: Determine the value that makes each equation true.

$\bigcirc^5 = -32$

Lecture Video <

Solution Video

Question 46: Factor the polynomial.

$x^4 = 2^4$

Lecture Video <

Solution Video

Question 47: When $x = 2, y = -3$ and $z = -1$ find the value of

$$\frac{x - y^2}{2z - x + y}$$

Lecture Video <

Solution Video

Question 48: Evaluate each expression for s =4 and t =8.

$3st^2 \div (st) + 6$

Lecture Video <

Solution Video

Question 49: Evaluate each expression for the given values.

$\frac{x}{y} + \frac{y}{x}$ when $x = -1\frac{1}{2}$ and $y = 2\frac{1}{4}$

Lecture Video

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Solution Video

Fractions Review

Question 1: Calculate.

$$7\frac{1}{3} + 2\frac{1}{2}$$

Lecture Video <

Solution Video

Question 2: Calculate.

$$4\frac{2}{5} + 1\frac{3}{4}$$

Lecture Video <

Solution Video

Question 3: Estimate each to whole number.

- $7\frac{1}{3} + 2\frac{1}{2}$
- $4\frac{2}{5} + 1\frac{3}{4}$
- $6\frac{3}{4} - 6\frac{2}{3}$
- $9\frac{1}{7} - 4\frac{4}{5}$

Lecture Video <

Solution Video

Question 4: Calculate.

$$6\frac{3}{4} - 6\frac{2}{3}$$

Lecture Video <

Solution Video

Question 5: Calculate.

$$9\frac{1}{7} - 4\frac{4}{5}$$

Lecture Video <

Solution Video

Question 6: Which of the following correctly explains $3\frac{1}{5} - 2\frac{1}{4}$ has the same answer as $\frac{3}{4} + \frac{1}{5}$?

Lecture Video <

Solution Video

Question 7: John works part-time at a restaurant. On Friday he worked $3\frac{1}{4}$ h and on Saturday he worked $6\frac{1}{2}$ h. How many hours did he work altogether?

Lecture Video

Solution Video

<

Question 8: Calculate each product without using a calculator.

$$2\frac{5}{8} \times \frac{4}{11}$$

Lecture Video

Solution Video

<

Question 9: Calculate each product without using a calculator.

$$1\frac{3}{5} \times 1\frac{2}{7}$$

Lecture Video

Solution Video

<

Question 10: Calculate each product without using a calculator.

$$2\frac{3}{5} \times 3\frac{1}{3}$$

Lecture Video <

Solution Video

Question 11: Calculate each product without using a calculator.

$$7\frac{1}{5} \times 4\frac{5}{6}$$

Lecture Video <

Solution Video

Question 12: Calculate each quotient without using a calculator.

$$5\frac{3}{4} \div \frac{1}{2}$$

Lecture Video <

Solution Video

Question 13: Calculate each quotient without using a calculator.

$$\frac{1}{2} \div 5\frac{3}{4}$$

Lecture Video <

Solution Video

Question 14: Calculate each quotient without using a calculator.

$$6\frac{2}{3} \div 2\frac{1}{6}$$

Lecture Video <

Solution Video

Question 15: Calculate each quotient without using a calculator.

$$10\frac{5}{8} \div 5\frac{1}{3}$$

Lecture Video <

Solution Video

Question 16: Find the missing value.

$$\square \div 5\frac{1}{3} = 4\frac{2}{3}$$

Lecture Video

Solution Video

<

Question 17: Find the missing value.

$$7\frac{3}{4} \div \square = 5\frac{1}{6}$$

Lecture Video

Solution Video

<

Question 18: Melissa is adjusting the two removable shelves in her cupboard. The shelves are to be equally spaced in the cupboard. How much space is above or below each shelf?

Lecture Video

Solution Video

<

Question 19: Suppose the on screen cursor represents any numeric character. Determine the number of numeric characters that can fit on the calculator screen.

Lecture Video <

Solution Video

Question 20: Calculate

a) $(-11)^2$

b) $(-4)^2$

c) -7^2

d) -11^3

Lecture Video <

Solution Video

Question 21: Determine at least four other powers that have the same value as 8^2.

Lecture Video

<

Solution Video

Question 22: Calculate. Show your steps.

$-[(5)(-1)]^3 - 2(-4)^3$

Lecture Video <

Solution Video

Question 23: When $x = 2, y = -3$ and $z = -1$ find the value of

$x^2 + y^2 + z^2$

Lecture Video <

Solution Video

Question 24: When $x = 2, y = -3$ and $z = -1$ find the value of

$2[x - (y - z)^4]$

Lecture Video <

Solution Video

Question 25: When $x = 2, y = -3$ and $z = -1$ find the value of

$\frac{2y+4z}{-x}$

Lecture Video <

Solution Video

Question 26: When $x = 2, y = -3$ and $z = -1$ find the value of

$$\frac{x - y^2}{2z - x + y}$$

Lecture Video <

Solution Video

1.4 Rational Numbers

Question 1: Convert the following fractions into decimal.

$\frac{5}{6}$

Lecture Video <

Solution Video

Question 2: Convert the following fractions into decimal and decimal into fractions.

a) 0.12

b) $\frac{5}{8}$

Lecture Video <

Solution Video

Question 3: Convert the following decimal into fractions.

0.33

Lecture Video <

Solution Video

Question 4: Write each fraction as a decimal.

$$-\frac{4}{3}$$

Lecture Video

Solution Video

Question 5: Rename the following rational numbers as decimals.

$$\frac{-3}{4}$$

Lecture Video

Solution Video

Question 6: Rename the following rational numbers as decimals.

$$-\frac{3}{4}$$

Lecture Video

Solution Video

Question 7: Rename the following rational numbers as decimals.

$$-7\frac{5}{6}$$

Lecture Video <

Solution Video

Question 8: Convert the following rational numbers as decimals.

$$\frac{1}{5}$$

Lecture Video <

Solution Video

Question 9: Write it as a decimal.

(a) $\frac{7}{1000}$ (b) $\frac{16}{100}$
(c) $\frac{843}{1000}$ (d) $\frac{91}{10000}$

Lecture Video <

Solution Video

Question 10: Convert the following decimal into fractions and reduce the fractions.

8.24

Lecture Video

Solution Video

<

Question 11: Convert the following decimal into fractions.

0.255

Lecture Video

Solution Video

<

Question 12: Rename the following rational numbers as quotients of integers.

-11.46

Lecture Video

Solution Video

<

Question 13: Identify the values represented by a, b, c, d, and e, in decimal form.

Lecture Video <

Solution Video

Question 14: Identify the values represented by a, b, c, d, and e, as quotients of two integers.

Lecture Video <

Solution Video

Question 15: Use >, <, or = to make true statements. Explain how you know each statement is true.

$0 \bigcirc -0.5$

Lecture Video <

Solution Video

Question 16: Use >, <, or = to make true statements. Explain how you know each statement is true.

$-4.3 \bigcirc -3.4$

Lecture Video

<

Solution Video

Question 17: Use >, <, or = to make true statements. Explain how you know each statement is true.

$-1\frac{2}{5} \bigcirc 1\frac{2}{5}$

Lecture Video

<

Solution Video

Question 18: Use >, <, or = to make true statements. Explain how you know each statement is true.

$-4\frac{1}{2} \bigcirc -\frac{9}{2}$

Lecture Video

<

Solution Video

Question 19: Use >, <, or = to make true statements. Explain how you know each statement is true.

$-2\frac{3}{10} \bigcirc -2.\bar{3}$

Lecture Video

<

Solution Video

Question 20: True or false? Justify your answer.

All mixed numbers can be renamed as decimals.

Lecture Video

<

Solution Video

Question 21: True or false? Justify your answer.

A rational number can be expressed as nay integer divided by any other integer.

Lecture Video

<

Solution Video

Question 22: True or false? Justify your answer.

$1 > -1000000$

Lecture Video

Solution Video

<

Question 23: If a and b are positive numbers and $a < b$, how do $-a$ and $-b$ compare? Explain why.

Lecture Video

Solution Video

<

Question 24: Write as an improper fraction:

$3\frac{2}{3}$

Lecture Video

Solution Video

<

Question 25: Write as a mixed number:

$9\frac{14}{3}$

Lecture Video

Solution Video

<

Question 26: Name three fractions between $\frac{2}{3}$ and $\frac{3}{8}$.

Lecture Video

Solution Video

<

Question 27: Name three fractions between $\frac{2}{3}$ and $\frac{3}{8}$.

Lecture Video

Solution Video

<

Question 28: Write each decimal as a fraction.

$0.0777...$

Lecture Video

Solution Video

<

Question 29: Write each repeating decimal as a fraction in simplest form.

$0.\overline{5}$

Lecture Video

Solution Video

<

Question 30: Convert the following decimal into fraction.

$0.3\overline{2}$

Lecture Video

Solution Video

<

Question 31: Express the repeating decimal as a fraction.

$2.11\overline{25}$

Lecture Video

<

Solution Video

Question 32: Write each repeating decimal as a fraction in simplest form.

$0.\overline{21}$

Lecture Video

<

Solution Video

1.5 Rational Number Operations

Question 1: Evaluate without using a calculator.

$2.5 - 7.5$

Lecture Video <

Solution Video

Question 2: Evaluate without using a calculator.

$-2(9.5)$

Lecture Video <

Solution Video

Question 3: Evaluate without using a calculator.

$-4.2 + (-2.8)$

Lecture Video <

Solution Video

Question 4: Estimate the two consecutive integers between which each answer will lie.

$-9.37 - 5.93$

Lecture Video <

Solution Video

Question 5: Evaluate without using a calculator.

$\frac{8}{-0.5}$

Lecture Video <

Solution Video

Question 6: Estimate the two consecutive integers between which each answer will lie.

$-\frac{3.046}{10}$

Lecture Video <

Solution Video

Question 7: Evaluate without using a calculator. Clearly show how you simplified the negatives.

$$-\frac{4}{3}+\frac{1}{3}$$

Lecture Video <

Solution Video

Question 8: Calculate. Show your work.

$$\frac{6}{5}-\frac{3}{2}$$

Lecture Video <

Solution Video

Question 9: Evaluate without using a calculator. Clearly show how you simplified the negatives.

$$\frac{-4}{7}\times\frac{6}{-5}$$

Lecture Video <

Solution Video

Question 10: Which of the following correctly explains why below is equal or not equal to $\frac{3}{4}(\frac{5}{8})$.

$-\frac{3}{4}(-\frac{5}{8})$

Lecture Video <

Solution Video

Question 11: Which of the following correctly explains why below is equal or not equal to $\frac{3}{4}(\frac{5}{8})$?

$\frac{-3}{4}(\frac{5}{-8})$

Lecture Video <

Solution Video

Question 12: Which of the following correctly explains below is the same or different from $\frac{3}{4}(\frac{5}{8})$?

$\frac{-3}{4}(\frac{-5}{8})$

Lecture Video <

Solution Video

Question 13: Which of the following correctly explains below is the same or different from $\frac{3}{4}(\frac{5}{8})$.

$\frac{3}{-4}(-\frac{5}{8})$

Lecture Video <

Solution Video

Question 14: Calculate. Show your work.

$(\frac{5}{-12})(-\frac{8}{15})$

Lecture Video <

Solution Video

Question 15: Find the product. Show your work.

$-2\frac{1}{2}(-1\frac{3}{5})$

Lecture Video <

Solution Video

Question 16: Calculate. Show your work.

$3\frac{6}{7}(-\frac{1}{3})$

Lecture Video

Solution Video

<

Question 17: Evaluate without using a calculator. Clearly show how you simplified the negatives.

$\frac{2}{5} \div (-\frac{5}{8})$

Lecture Video

Solution Video

<

Question 18: Calculate. Show your work.

$\frac{15}{16} \div (-1\frac{1}{24})$

Lecture Video

Solution Video

<

Question 19: Calculate. Show your work.

$$-4\frac{2}{3} \div \frac{7}{12}$$

Lecture Video <

Solution Video

Question 20: Calculate. Show your work.

$$-2\frac{5}{6} \div (-1\frac{1}{12})$$

Lecture Video <

Solution Video

Question 21: Evaluate.

$$-\frac{15}{16} \times 3\frac{1}{5} \div (-1\frac{2}{3})$$

Lecture Video <

Solution Video

Question 22: Estimate the two consecutive integers between which each answer will lie.

$3.64 + 72.9$

Lecture Video

Solution Video

<

Question 23: Estimate the two consecutive integers between which each answer will lie.

$-6.5(-10.1)$

Lecture Video

Solution Video

<

Question 24: The daily changes in selling price for a particular stock during a week were $-\$2.78$, $-\$5.45$, $-\$5.45$, $\$0.38$, and $\$2.12$.

If the selling price of the stock was $\$58.22$ at the start of the week, then what was the selling price at the end of the week?

Lecture Video

Solution Video

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Question 25: The daily changes in selling price for a particular stock during a week were $-\$2.78$, $-\$5.45$, $-\$5.45$, $\$0.38$, and $\$2.12$.

What was the average daily change in selling price for the stock during this week?

Lecture Video <

Solution Video

Question 26: Calculate. Show your work.

$$-\frac{3}{8}+1\frac{3}{4}$$

Lecture Video <

Solution Video

Question 27: Calculate. Show your work.

$$-5\frac{1}{2}+2\frac{2}{3}$$

Lecture Video <

Solution Video

Question 28: Calculate. Show your work.

$$-7\frac{3}{5} + (-8\frac{1}{4})$$

Lecture Video <

Solution Video

Question 29: Calculate. Show your work.

$$-3\frac{1}{3} - 5\frac{4}{5}$$

Lecture Video <

Solution Video

Question 30: Calculate. Show your work.

$$-9\frac{1}{2} - (-10\frac{3}{4})$$

Lecture Video <

Solution Video

Question 31: Evaluate each expression.

$$-\frac{2}{5}+\frac{3}{-4}-2\frac{2}{3}$$

Lecture Video <

Solution Video

Question 32: Yolo takes $\frac{3}{4}$ hours to cut his family's front lawn and $1\frac{1}{3}$ hours to cut the back lawn. How much longer does it take Yolo to cut the back lawn?

Lecture Video <

Solution Video

Question 33: (a) In each case, determine the numbers represented by the rectangle and the triangle.

(b) Describe the connection between the number represented by the rectangle and the number represented by the triangle

(c) Create a similar question that demonstrates this connection.

Lecture Video <

Solution Video

Question 34: Determine the value that makes each equation true

$$-\frac{3}{4} + \bigcirc = 1$$

Lecture Video <

Solution Video

Question 35: Determine the value that makes each equation true

$$-\frac{3}{4} - \bigcirc = 1$$

Lecture Video <

Solution Video

Question 36: Determine the value that makes each equation true

$$-\frac{3}{4} \times \bigcirc = 1$$

Lecture Video <

Solution Video

Question 37: Determine the value that makes each equation true

$$-\frac{3}{4} \div \bigcirc = 1$$

Lecture Video

Solution Video

Question 38: Without calculating, determine the sign for each answer. Then, use a calculator to complete the calculation.

$$-3.2(4.2 - 10)$$

Lecture Video

Solution Video

Question 39: Without calculating, determine the sign for each answer. Then, use a calculator to complete the calculation.

$$-0.7 - 5.8(12)$$

Lecture Video

Solution Video

Question 40: Evaluate.

$$-3.4(-2.3) + 5.7(-9.1)$$

Lecture Video <

Solution Video

Question 41: Without calculating, determine the sign for each answer. Then, use a calculator to complete the calculation.

$$(i) \quad 6.2(-3.1)(7.3 - 0.9) \quad (ii) \quad \frac{3.2}{-1.2} + \frac{-4.5}{-6} \quad (iii) \quad \frac{8.5-(-2.3)}{2(-1.2)}$$

Lecture Video <

Solution Video

Question 42: Evaluate.

$$-2\frac{1}{3} + (\frac{3}{-4}) \times (-1\frac{5}{6})$$

Lecture Video <

Solution Video

Question 43: Calculate using a calculator.

$5.25(-2\frac{7}{8}) - 8.5(-3\frac{3}{4})$

Lecture Video <

Solution Video

Question 44: Evaluate each expression.

$-2\dfrac{1}{4} \times (1\dfrac{3}{4} - 5\dfrac{1}{2})$

Lecture Video <

Solution Video

Question 45: Calculate using a calculator.

$-3.4 + 2\frac{1}{2} - 0.68(2\frac{16}{17})$

Lecture Video <

Solution Video

Question 46: The formula to convert temperatures between degrees Fahrenheit and degrees Celsius is $C = \frac{5}{9}(F - 32)$. Apply the formula to convert the following.

Miami, Florida's record high of 98^oF to degrees Celsius.

Lecture Video <

Solution Video

Question 47: The formula to convert temperatures between degrees Fahrenheit and degrees Celsius is $C = \frac{5}{9}(F - 32)$. Apply the formula to convert the following.

Anchorage, Alaska's record low of -38^oF to degrees Celsius.

Lecture Video <

Solution Video

Question 48: The formula to convert temperatures between degrees Fahrenheit and degrees Celsius is $C = \frac{5}{9}(F - 32)$. Apply the formula to convert the following.

Create a similar question that demonstrates this connection.

Lecture Video <

Solution Video

Question 49: The formula to convert temperatures between degrees Celsius and degrees Fahrenheit is $F = \frac{9}{5}C + 32$. Use this formula to convert the following.

The boiling point of water, 100^oC, to degrees Fahrenheit.

Lecture Video <

Solution Video

Question 50: The formula to convert temperatures between degrees Celsius and degrees Fahrenheit is $F = \frac{9}{5}C + 32$. Use this formula to convert the following.

Normal body temperature, 37°, to degrees Fahrenheit.

Lecture Video <

Solution Video

Question 51: Evaluate each expression for the given values.

$x - 2y$ when $x = -9.78$ and $y = 3.2$

Lecture Video <

Solution Video

Question 52: Evaluate each expression for the given values.

$(x+y)(x-y)$ when $x = 2.5$ and $y = -7.8$

Lecture Video <

Solution Video

Question 53: Evaluate each expression for the given values.

$x(x+y)$ when $x = -2\frac{1}{2}$ and $y = 3\frac{3}{4}$

Lecture Video <

Solution Video

Question 54: Evaluate each expression for the given values.

$\dfrac{x}{y} + \dfrac{y}{x}$ when $x = -1\frac{1}{2}$ and $y = 2\frac{1}{4}$

Lecture Video <

Solution Video

Question 55: James finished a full marathon in a time of $3:57:53.3$ ($hours:minutes:seconds$). The winner of the marathon finished in a time of $2:25:55.6$. Determine how much longer James took to complete the marathon than the winner did.

Lecture Video <

Solution Video

Question 56: Calculate $-2\frac{3}{5}+1\frac{1}{4}$ without using a calculator.

Lecture Video <

Solution Video

Question 57: Calculate $-2\frac{4}{7}+1\frac{1}{6}$ without using a calculator.

Lecture Video <

Solution Video

Question 58: Calculate.

$$-(2\frac{1}{4})^2 + 1.5^3$$

Lecture Video <

Solution Video

Question 59: Calculate.

$$-5\frac{2}{3} + 3.\bar{6}(0.\bar{3})^2$$

Lecture Video <

Solution Video

Question 60: $1 + \dfrac{1}{1 + \frac{1}{1+\frac{1}{2}}}$ is an example of a continued fraction.

The continued fraction above is equal to?

Lecture Video <

Solution Video

Question 61: $1 + \dfrac{1}{1 + \frac{1}{1+\frac{1}{2}}}$ is an example of a continued fraction.

Determine the continued fraction representation for $1\frac{4}{5}$.

Hint $\frac{4}{5} = \frac{1}{\frac{5}{4}}$

Lecture Video <

Solution Video

Question 62: A backyard deck has an area out of square blocks that are $1\frac{1}{2}$ ft by $1\frac{1}{2}ft$. The area of his patio is $175\frac{1}{2}$ sq ft and the length is $19\frac{1}{2}ft$.

a) Determine the width of his patio.

b) Determine the number of blocks Gavin used to make his patio.

Lecture Video <

Solution Video

1.6 Powers of Rational Numbers

Question 1: Evaluate the expression.

$(-3)^4$

Lecture Video <

Solution Video

Question 2: Use $4.5^2 = 20.25$ and $4.5^3 = 91.125$ to evaluate the powers.

$(-4.5)^3$

Lecture Video <

Solution Video

Question 3: Without evaluating, state if the answer is positive or negative.

a) $-(-\frac{2}{3})^2$,

b) $-(-\frac{2}{3})^3$

Lecture Video <

Solution Video

Question 4: Without evaluating, state if the answer is positive or negative.

a) $-(\frac{2}{3})^3$

b) $(\frac{-2}{-3})^5$

Lecture Video <

Solution Video

Question 5: Evaluate the powers

$(a) \quad -\frac{4}{3}(-\frac{2}{3})^2 \quad (c) \quad -(-\frac{2}{3})^2 \quad (e) \quad -(\frac{2}{3})^3$

$(b) \quad -(\frac{2}{3})^2 \quad (d) \quad -(-\frac{2}{3})^3 \quad (f) \quad (\frac{-2}{-3})^5$

Lecture Video <

Solution Video

Question 6: Calculate.

$-2(-3.1)^3$

Lecture Video <

Solution Video

Question 7: Use $4.5^2 = 20.25$ and $4.5^3 = 91.125$ to evaluate the powers.

-4.5^2

Lecture Video <

Solution Video

Question 8: Without evaluating, state if the answer is positive or negative.

a) $-\frac{4}{3}$

b) , $-(\frac{2}{3})^2$

Lecture Video <

Solution Video

Question 9: Use $4.5^2 = 20.25$ and $4.5^3 = 91.125$ to evaluate the powers.

-4.5^3

Lecture Video <

Solution Video

Question 10: Evaluate $-4.5 + 2(3.1 - 9.8)^2$.

Lecture Video

Solution Video

<

Question 11: Calculate.

$8.9 - 3.2^2$

Lecture Video

Solution Video

<

Question 12: Calculate.

$0.6^2 - 2(3.4 - 5.2)$

Lecture Video

Solution Video

<

Question 13: Calculate.

$$-6.02 - 2(-6.71) + 2.3^3$$

Lecture Video <

Solution Video

Question 14: Calculate.

$$\frac{2.3^3 - 5.4}{-3^2}$$

Lecture Video <

Solution Video

Question 15: Calculate.

$$\frac{2.3^3 - 5.4}{-3^2}$$

Lecture Video <

Solution Video

Question 16: Calculate.

$$2(-\frac{1}{3})^2$$

Lecture Video <

Solution Video

Question 17: Calculate.

$$-\left(\frac{4}{5}\right)^2+\left(\frac{5}{4}\right)^2$$

Lecture Video <

Solution Video

Question 18: Calculate.

$$\frac{-\frac{1}{3}+(\frac{1}{4})^2}{-1\frac{1}{6}}$$

Lecture Video <

Solution Video

Question 19: Calculate.

$$(-(2\frac{1}{2})^2)^2$$

Lecture Video

Solution Video

<

Question 20: Rob invests $\$100$ in an account earning interest at a rate of 500 per year for 10 years. Sharon invests the same amount of money as Rob but she earns interest at a rate of 10% per year for 3 years.

Calculate the value of both investments.

Lecture Video

Solution Video

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Question 21: Tania invests $\$100$ and earns interest at a rate of 4% per year for 10 years. Eda invests $\$100$ and earns interest at a rate of 2% every 6 months for 10 years.

a) Calculate the value of both investments.

b) Explain why Eda's investment is worth more at the end of 10 years.

Lecture Video

Solution Video

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Question 22: radioactive material has a half-life of 1 day. The material decays according to the equation $M = 1000(\frac{1}{2})^t$. Mass M is measured in grams and time t is measured in days.

a) What is the mass of the sample after 1 day? 2 days? 10 days?

b) Use a calculator with an exponent key to compute the mass of the sample after 1 year. Explain what the answer means.

Lecture Video <

Solution Video

Question 23: Evaluate the following expressions.

$x^2 + x - 5$ when $x = 1\frac{3}{4}$

Lecture Video <

Solution Video

Question 24: Evaluate the following expressions.

$3x^2 + 6x$ when $x = -\frac{1}{4}$

Lecture Video <

Solution Video

Question 25: Solve for x.

$$5(\frac{x}{3})^2 - 3\frac{1}{9} = -\frac{8}{9}$$

Lecture Video

<

Solution Video

Chapter Review

Question 1: Calculate without using a calculator.

$$1\frac{2}{3} + 9\frac{1}{2}$$

Lecture Video <

Solution Video

Question 2: Calculate without using a calculator.

$$4\frac{3}{8} + 2\frac{1}{4}$$

Lecture Video <

Solution Video

Question 3: Calculate. Show your work.

$$2\frac{1}{4} - 5\frac{1}{3}$$

Lecture Video <

Solution Video

Question 4: Calculate without using a calculator.

$$8\frac{1}{6} - 7\frac{2}{3}$$

Lecture Video <

Solution Video

Question 5: Calculate without using a calculator.

$$5\frac{5}{6} - 3\frac{3}{4}$$

Lecture Video <

Solution Video

Question 6: Calculate. Show your work.

$$-5\frac{2}{5} + 2\frac{3}{4}$$

Lecture Video <

Solution Video

Question 7: Calculate without using a calculator.

$$1\frac{3}{4} \times 3\frac{1}{2}$$

Lecture Video

Solution Video

<

Question 8: Calculate without using a calculator.

$$5\frac{7}{9} \times 6\frac{3}{4}$$

Lecture Video

Solution Video

<

Question 9: Calculate without using a calculator.

$$1\frac{2}{3} \div 4\frac{5}{6}$$

Lecture Video

Solution Video

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Question 10: Which of the following explains the two are either same or not same? -8^2 and $(-8)^2$.

HINT

Lecture Video <

Solution Video

Question 11: Evaluate.

$(-8+2)^2 \div (-4+2)^2$

Lecture Video <

Solution Video

Question 12: Evaluate.

$$\frac{(-16+4) \div 2}{8 \div (-8)+4}$$

Lecture Video <

Solution Video

Question 13: Evaluate.

$16 - [3(6 - 3) - 12]$

Lecture Video <

Solution Video

Question 14: Evaluate.

$$\frac{20 + (-12) \div (-3)}{(-4 - 12) \div (-2)}$$

Lecture Video <

Solution Video

Question 15: Calculate. Show your steps.

$[5.12 - 3(4.1)]^3$

Lecture Video <

Solution Video

Question 16: Calculate. Show your steps.

$9.1^3 - 6.7^2$

Lecture Video <

Solution Video

Question 17: Evaluate.

$x^2 - 4x$ for $x = -3$

Lecture Video <

Solution Video

Question 18: Evaluate.

$yx^2 + xy$ for $x = -4$ and $y = 5$

Lecture Video <

Solution Video

Question 19: Evaluate each.

$(3a-2b)^3$ when $a=-1.1, b=2.2$

Lecture Video <

Solution Video

Question 20: Evaluate.

$\dfrac{-x^4-5x}{x+(-1)^3}$ for $x=-2$

Lecture Video <

Solution Video

Question 21: What two integers is -2.6 located on the number line.

Lecture Video <

Solution Video

Question 22: What two integers is $-\frac{24}{5}$ located on the number line.

Lecture Video

Solution Video

<

Question 23: Calculate. Show your work.

$$-6\frac{3}{4}(5\frac{1}{9})$$

Lecture Video

Solution Video

<

Question 24: Calculate. Show your work.

$$1\frac{3}{4} \div (-\frac{30}{49})$$

Lecture Video

Solution Video

<

Question 25: Calculate.

$6.4 - 4.2 \times 1.5$

Lecture Video

Solution Video

<

Question 26: Calculate.

$-12.4 + (-16.8) \div (-4.2)$

Lecture Video

Solution Video

<

Question 27: Calculate.

$$\frac{15.3 + 2.7 \div 3}{-2 \times 8.1}$$

Lecture Video

Solution Video

<

Question 28: Calculate.

$$\frac{16 - 4.8 \times 2.1}{6 + 6 \div (-6)}$$

Lecture Video <

Solution Video

Question 29: Calculate. Show your work.

$$\frac{2}{5} \div (-\frac{2}{5} + \frac{1}{10})$$

Lecture Video <

Solution Video

Question 30: Calculate. Show your work.

$$[\frac{1}{8} + (-\frac{2}{3})] \times \frac{12}{13}$$

Lecture Video <

Solution Video

Question 31: Calculate. Show your steps.

$$-2\frac{1}{10}+(2\frac{3}{5}-3\frac{1}{4})^3$$

Lecture Video <

Solution Video

Question 32: Calculate. Show your steps.

$$-\frac{1}{4}\div\frac{5}{4}-2\frac{1}{3}\div(-\frac{2}{3})^3$$

Lecture Video <

Solution Video

Question 33: Calculate. Show your work.

$$-\frac{5}{6}+\frac{-2}{3}\times\frac{3}{4}$$

Lecture Video <

Solution Video

Question 34: Calculate. Show your work.

$$-1\frac{1}{2} + \frac{-1}{-2} - \frac{-3}{5}$$

Lecture Video <

Solution Video

Question 35: Mike invests $\$100$ in an account earning interest at a rate of 4% every 6 months. Calculate the value of his investment at the end of 4 years.

Lecture Video <

Solution Video

Question 36: Use >, <, or = to make true statements. Explain how you know each statement is true.

a) $(\frac{1}{-2})^3 \bigcirc (\frac{1}{2})^2$

b) $(\frac{3}{4})^3 \bigcirc (-\frac{1}{4})^2$

c) $(-0.5)^3 \bigcirc (\frac{1}{2})^2$

d) $(\frac{3}{2})^3 \bigcirc (-\frac{3}{-2})^4$

Lecture Video <

Solution Video

Question 37: Find the area of the circle using $A = \pi r^2$ when given each radius

a) $r = 5.2cm$

b) $r = 2\frac{5}{8}$ in.

c) $r = 8.9m$

d) $r = 4\frac{2}{3}$ in.

Lecture Video <

Solution Video

Question 38: Evaluate each.

$4a^2b^2$ when $a = \dfrac{-2}{3}, b = -\dfrac{1}{2}$

Lecture Video <

Solution Video

Question 39: Evaluate each.

$(2ab)^2$ when $a = -0.5, b = 1.2$

Lecture Video <

Solution Video

Question 40: Evaluate each.

$(\frac{2a}{5b})^2$ when $a = 1\frac{1}{2}, b = -\frac{2}{5}$

Lecture Video

<

Solution Video

Chapter 2 Exponents & Polynomials

2.1 Representing Powers Up to Degree 3

Question 1: Sketch models to represent each of the following algebraic expressions. The variables x and y do not represent the same number.

x^2

Lecture Video <

Solution Video

Question 2: Calculate the side length of a square with an area of $49cm^2$.

Lecture Video <

Solution Video

Question 3: Sketch models to represent each of the following algebraic expressions.

The variables x and y do not represent the same number.

x^2

Lecture Video <

Solution Video

Question 4: Sketch models to represent each of the following algebraic expressions.

The variables x and y do not represent the same number.

x^3

Lecture Video <

Solution Video

Question 5: Sketch models to represent each of the following algebraic expressions.

The variables x and y do not represent the same number.

y

Lecture Video <

Solution Video

Question 6: Sketch models to represent each of the following algebraic expressions.

The variables x and y do not represent the same number.

$(2y)^2$

Lecture Video <

Solution Video

Question 7: The area of some squares are shown. Determine or estimate the length of the sides of each square. use a calculator to check your answers.

$144km^2$

Lecture Video <

Solution Video

Question 8: The area of some squares are shown. Determine or estimate the length of the sides of each square. use a calculator to check your answers.

$75cm^2$

Lecture Video <

Solution Video

Question 9: The area of some squares are shown. Determine or estimate the length of the sides of each square. use a calculator to check your answers.

$0.01m^2$

Lecture Video <

Solution Video

Question 10: Choose the expression that represents the indicated quantity:

Lecture Video <

Solution Video

Question 11: Choose the expression that represents the indicated quantity: the length of the line

Lecture Video <

Solution Video

Question 12: Choose the expression that represents the indicated quantity:

the side length

Lecture Video <

Solution Video

Question 13: Choose the expression that represents the indicated quantity: the area of the square face

Lecture Video <

Solution Video

Question 14: If the footprint of a square building has an area of $50m^2$, which is a bette estimate for the length of the front of the building: $7.2m$ or $7.7m$? Explain how you can answer this without using a

calculator.

Lecture Video <

Solution Video

Question 15: If the length of the side of a square game board is $\sqrt{1000}cm$, what is the area of the game board? How can you check your answer?

Lecture Video <

Solution Video

Question 16: Draw or build a model of the algebraic expression ab where a is not equal to b. Explain how this model is the same as and how it is different from a model of the algebraic expression a^2.

Lecture Video <

Solution Video

Question 17: Draw or build a model of the algebraic expression abc where a, b, and c are not equal to each other. Compare this to a model of the algebraic expression ab^2.

Lecture Video <

Solution Video

Question 18: The symbol $\sqrt[3]{\bigcirc}$ represents the cube root. For example, $4 \times 4 \times 4 = 64, \sqrt[3]{64} = 4$. Create a geometric model to represent $\sqrt[3]{64}$. Explain why the model makes sense.

Lecture Video <

Solution Video

2.2 Multiplying and Dividing Powers

Question 1: Simplify

$(2^2)(2^3)$

Lecture Video <

Solution Video

Question 2: Simplify.

$$\left(\frac{2}{5}\right)^3 \left(\frac{2}{5}\right)^2 \left(\frac{2}{5}\right)^4$$

Lecture Video <

Solution Video

Question 3: Simplify.

$(5^7)(5^4)$

Lecture Video <

Solution Video

Question 4: Simplify.

$(5^6)(5^5)$

Lecture Video <

Solution Video

Question 5: Simplify.

$(5^4)(5^2)(5^5)$

Lecture Video <

Solution Video

Question 6: Simplify.

$(5^3)(5)(5^5)(5^2)$

Lecture Video <

Solution Video

Question 7: Simplify

$(x^4)(x^3)$

Lecture Video

Solution Video

<

Question 8: Simplify.

$(m^4)(m^2)$

Lecture Video

Solution Video

<

Question 9: Simplify.

$(7^3)(7)(x^4)(x^2)$

Lecture Video

Solution Video

<

Question 10: Simplify.

$(x^4)(-2)(x^5)(-2)^3$

Lecture Video <

Solution Video

Question 11: Simplify.

$(a^5)(3^2)(a^4)(a)(3)$

Lecture Video <

Solution Video

Question 12: Simplify

$\frac{2^5}{2^2}$

Lecture Video <

Solution Video

Question 13: Simplify if possible, and then evaluate

$$\frac{(2^7)}{2^5}$$

Lecture Video <

Solution Video

Question 14: Simplify

$$\frac{5^7}{5^2}$$

Lecture Video <

Solution Video

Question 15: Simplify if possible, and then evaluate

$$\frac{2^8}{2^5}$$

Lecture Video <

Solution Video

Question 16: Simplify if possible, and then evaluate

$$\frac{\left(\frac{2}{7}\right)^4}{\left(\frac{2}{7}\right)^2}$$

Lecture Video <

Solution Video

Question 17: Simplify

$$\frac{y^6}{y^3}$$

Lecture Video <

Solution Video

Question 18: Simplify

$$\frac{m^4}{m^2}$$

Lecture Video <

Solution Video

Question 19: Simplify

$$\frac{(2^5)(x^3)}{(2^4)(x^2)}$$

Lecture Video <

Solution Video

Question 20: Simplify

$$\frac{(-5)^3 y^{10}}{(-5)(y^6)(y^3)}$$

Lecture Video <

Solution Video

Question 21: Simplify

$$\frac{(7^6)(a^3)(7^2)}{(7^3)a}$$

Lecture Video <

Solution Video

Question 22: Simplify if possible, and then evaluate

$$\frac{(5^5)(3)(3^4)}{(3^3)(5^4)}$$

Lecture Video <

Solution Video

Question 23: Simplify if possible, and then evaluate

$$\frac{\left(\frac{4}{5}\right)^5\left(\frac{4}{5}\right)^4}{\left(\frac{4}{5}\right)^6}$$

Lecture Video <

Solution Video

Question 24: Simplify, and then evaluate for $x = 2$ and $y = 5$

$$\frac{(x^4)(x^3)}{x^6}$$

Lecture Video <

Solution Video

Question 25: Simplify, and then evaluate for $x = 2$ and $y = 5$.

$$\frac{(y^6)(y^4)}{(y^8)(y)}$$

Lecture Video <

Solution Video

Question 26: Simplify, and then evaluate for $x = 2$ and $y = 5$

$$\frac{y^6x^4}{x^3y^3}$$

Lecture Video <

Solution Video

Question 27: Simplify

$$\frac{(10^{10})x^4y^5}{(10^8)xy}$$

Lecture Video <

Solution Video

Question 28: Simplify

$$\frac{x^2y^4}{x^3y}$$

Lecture Video <

Solution Video

Question 29: Simplify, and then evaluate for $x = 2$ and $y = 5$.

$$\frac{(y^6)(x^4)}{(x^3)(y^3)}$$

Lecture Video <

Solution Video

Question 30: Simplify, and then evaluate for $x = 2$ and $y = 5$.

$$\frac{6(x^4(y^6)}{3(x^3)(y^3)}$$

Lecture Video <

Solution Video

Question 31: Simplify, and then evaluate for $x = 2$ and $y = 5$.

$$\frac{6x^4y^6}{3x^3y^3}$$

Lecture Video <

Solution Video

Question 32: Simplify.

$(5^2)(5^8)$

Lecture Video <

Solution Video

Question 33: Create four different expressions involving exponents that simplify to 7^8

Lecture Video <

Solution Video

Question 34: Simplify if possible, and then evaluate

$$\frac{(4^5)(4^6)}{4^7}$$

Lecture Video <

Solution Video

Question 35: Simplify if possible, and then evaluate

$$\frac{(7^3)(3^2)(3^4)(7)}{(3^3)(7^2)}$$

Lecture Video <

Solution Video

Question 36: Simplify if possible, and then evaluate

$$\frac{(4.2^3)(4.2^5)}{4.2^7}$$

Lecture Video <

Solution Video

Question 37: If you know that the product of two points is 7^{10} and that the quotient is 7^2, what could the two powers be? How could you verify your answer?

Lecture Video <

Solution Video

Question 38: Complete the table to show the relationship between the metric units of length. Express each relationship as a power with base 10.

	$Millimetres$	$Centimetres$	$Metres$	$Kilometres$
$Millimetres$				
$Centimetres$				
$Metres$				
$Kilometres$				

Lecture Video <

Solution Video

Question 39:

- **a)** Evaluate $\frac{3^5}{3^5}$
- **b)** Simplify $\frac{3^5}{3^5}$ using the exponent principle for quotients.
- **c)** Use the meaning of the powers in $\frac{3^5}{3^5}$ to simplify the expression.
- **d)** Discuss what 3^0 might mean.
- **e)** Discuss whether a^0 would have a similar meaning for any value of a.

Lecture Video <

Solution Video

Question 40: Simplify.

$k^2n^3 \times kn^4$

Lecture Video

Solution Video

<

Question 41: Simplify.

$a^2b^2 \times a^3b$

Lecture Video

Solution Video

<

Question 42: Multiply.

$\left(8r^3s^2t\right)\left(4s^3t\right)$

Lecture Video

Solution Video

<

Question 43: Simplify.

$(b^5)3^4(b^3)3^2(b^7)$

Lecture Video <

Solution Video

Question 44: Simplify

$$\frac{(xy)^5}{x^4y^3}$$

Lecture Video <

Solution Video

Question 45: Simplify, and then evaluate for $x = 2$ and $y = 5$.

$$\frac{\left(\frac{3}{4}xy\right)^3}{\left(\frac{3}{4}\right)^2 xy^2}$$

Lecture Video <

Solution Video

Question 46: Simplify, and then evaluate for $x = 2$ and $y = 5$.

$$\frac{(x^5)(x^4)}{x^8}$$

Lecture Video <

Solution Video

Question 47: Scientists estimate that there are 50×10^{12} cells in the average human. There are approximately 6×10^9 humans in the world. Approximately how many cells do all the humans on the earth have? Write your answer using a power with base 10.

Lecture Video <

Solution Video

Question 48: The annual worldwide production of all grains is about 9×10^{12}kg. How much grain is produced per person if there are approximately 6×10^9 people in the world?

Lecture Video <

Solution Video

Question 49: How many centimetres in 5 km.

Lecture Video

Solution Video

<

Question 50: Determine the number of millimetres in 4 m.

Lecture Video

Solution Video

<

2.3 Power of a Power

Question 1: Express each of the follow as a power withe a single exponent.

$(7^3)^5$

Lecture Video

Solution Video

<

Question 2: Express each of the following as a power with a single exponent.
$(3^4)^2$

Lecture Video

Solution Video

<

Question 3: Express each of the following as a power with a single exponent.
$(2^5)^3$

Lecture Video

Solution Video

<

Question 4: Express each of the following as a power with a single exponent.
$(10^6)^6$

Lecture Video <

Solution Video

Question 5: Express each of the following as a power with a single exponent.
$(10^6)^6$

Lecture Video <

Solution Video

Question 6: Express each of the following as a power with a single exponent.
$(5^2)^4$

Lecture Video <

Solution Video

Question 7: Express each of the follow as a power withe a single exponent.

$(x^4)^6$

Lecture Video <

Solution Video

Question 8: Express each of the follow as a power withe a single exponent.

$(c^3)^2$

Lecture Video <

Solution Video

Question 9: Express each of the following as a power with a single exponent.
$(x^2)^3$

Lecture Video <

Solution Video

Question 10: Simplify

- **a)** $(y^3)^4$
- **b)** $(m^2)^3$

Lecture Video <

Solution Video

Question 11: Simplify

$(c^3)^3$

Lecture Video <

Solution Video

Question 12: Simplify

$(n^3)^4$

Lecture Video <

Solution Video

Question 13: Simplify and evaluate each. Use $a = 2$, $b = -1$, and $c = 4$.

$(b^3)^2$

Lecture Video <

Solution Video

Question 14: Express each of the following as a power with a prime base

16

Lecture Video <

Solution Video

Question 15: Express each of the following as a power with a prime base

4^3

Lecture Video <

Solution Video

Question 16: Express each of the following as a power with a prime base

9^4

Lecture Video <

Solution Video

Question 17: Express each of the following as a power with the base indicated.

(16^2) with a base of 4

Lecture Video <

Solution Video

Question 18: Express each of the following as a power with the base indicated.

16^2 with a base of 2

Lecture Video <

Solution Video

Question 19: Express each of the following as a power with the base indicated.

25^3 with a base of 5

Lecture Video <

Solution Video

Question 20: Express each of the following as a power with the base indicated.

27^3 with a base of 3

Lecture Video <

Solution Video

Question 21: Write each power in simplified form

4^5 as a power of 2

Lecture Video <

Solution Video

Question 22: Write each power in simplified form

9^6 as a power of 3

Lecture Video

Solution Video

<

Question 23: Write each power in simplified form

27^4 as a power of 3

Lecture Video

Solution Video

<

Question 24: Write each power in simplified form

$(-125)^7$ as a power of (-5)

Lecture Video

Solution Video

<

Question 25: Simplify

$(3^4)(3^5)$

Lecture Video

Solution Video

Question 26: Simplify

$\frac{(2^3)^3}{2^4}$

Lecture Video

Solution Video

Question 27: Simplify

$\frac{(2^5 \times 5^2)^2}{(2^4 \times 5)^2}$

Lecture Video

Solution Video

Question 28: Evaluate.

$$\frac{(2^3)^4}{(2^2)^5}$$

Lecture Video <

Solution Video

Question 29: Evaluate.

$$\frac{(5^3)^6}{(5^3)^5}$$

Lecture Video <

Solution Video

Question 30: Evaluate.

$$\frac{(6)(2^3)^3}{(2^2)^4}$$

Lecture Video <

Solution Video

Question 31: Evaluate.

$$\frac{(5^2)^3(7^3)^4}{(7^{11})(5^5)}$$

Lecture Video <

Solution Video

Question 32: Evaluate.

$$\frac{(5^2)(6^6)}{(5^1)^4(6^2)^3}$$

Lecture Video <

Solution Video

Question 33: Simplify

$$\frac{(5^3 \times 5^2)^2}{(5^4 \times 5)^2}$$

Lecture Video <

Solution Video

Question 34: Simplify

$$\frac{(5^5 \times 5^2)^2}{(5^4 \times 5)^2}$$

Lecture Video <

Solution Video

Question 35: Simplify

$$(5^4)^3(5^4)^3$$

Lecture Video <

Solution Video

Question 36: Simplify

$$(4^3 \times 3^2)^2(4^5 \times 3^2)^3$$

Lecture Video <

Solution Video

Question 37: Simplify

$$\left(\frac{3^4}{3^3}\right)^2$$

Lecture Video <

Solution Video

Question 38: Simplify

$$(v^2)^2(v)$$

Lecture Video <

Solution Video

Question 39: Simplify

$$(n^4)^3(n^2)^3$$

Lecture Video <

Solution Video

Question 40: Simplify

$(2x^3)^4(2x^2)^5$

Lecture Video <

Solution Video

Question 41: Simplify

$\frac{(k^5)^3}{k^2}$

Lecture Video <

Solution Video

Question 42: Simplify

$\frac{(j^8)^2}{(j^5)^2}$

Lecture Video <

Solution Video

Question 43: Simplify

$$\frac{(j^8)^2}{(j^5)^2}$$

Lecture Video <

Solution Video

Question 44: Simplify

$$\frac{(5^3a^4)^5}{(5^4a^3)^2}$$

Lecture Video <

Solution Video

Question 45: Simplify and evaluate each. Use $a = 2$, $b = -1$, and $c = 4$.

$$\frac{(c^2)^3}{c^5}$$

Lecture Video <

Solution Video

Question 46: Simplify and evaluate each.

$\dfrac{(x^5)^2(x^7)^3}{(x^4)^6}$ when $x = 2$

Lecture Video <

Solution Video

Question 47: Simplify

$\left(\dfrac{y^6}{y^4}\right)^3$

Lecture Video <

Solution Video

Question 48: Simplify

$(5a^2 \times 2b^3)^2$

Lecture Video <

Solution Video

Question 49: Simplify

$(3x^4y^2)^3$

Lecture Video <

Solution Video

Question 50: Simplify

$$\frac{(5a^3)^5}{(5a^5b^2)^2}$$

Lecture Video <

Solution Video

Question 51: Simplify

$(3a^3)^2(3^3a^5b^2)^2$

Lecture Video <

Solution Video

Question 52: Without actually computing the values, explain how you know that each expression below is equal to 0.

(a) $(3^2)^6 - (3^3)^4$

(b) $(10^2)^8 - (10^4)^4$

(c) $(-2^3)^2 - (-2^2)^3$

Lecture Video <

Solution Video

Question 53: Show that 3^{10} is the same as 9^5 using your understanding of exponents.

Lecture Video <

Solution Video

Question 54: The length of the side of a cube is 3^5. Express its surface area and volume using powers and simplify.

Lecture Video <

Solution Video

Question 55: Determine an expression for the area of the square drawn on the hypotenuse.

Lecture Video <

Solution Video

Question 56: Evaluate.

$$\frac{[(2^4)^2]^3}{[(2^2)^3]^2}$$

Lecture Video <

Solution Video

Question 57: Simplify and evaluate each. Use $a = 2$, $b = -1$, and $c = 4$.

$$\frac{a^5}{a^2}$$

Lecture Video <

Solution Video

Question 58: Simplify and evaluate each. Use $a = 2$, $b = -1$, and $c = 4$.

$$\frac{a^3b^3}{ab}$$

Lecture Video <

Solution Video

Question 59: Simplify and evaluate each.

$\frac{(m)^{11}}{(m^5)^2} + \frac{n^7}{(n^2)^3}$ when $m = 3$ and $n = 4$

Lecture Video <

Solution Video

Question 60: Determine the value of the exponent that makes each statement true.

$4^3 = 2^x$

Lecture Video <

Solution Video

Question 61: Determine the value of the exponent that makes each statement true.

$6^9 = 216^x$

Lecture Video <

Solution Video

Question 62: Determine the value of the exponent that makes each statement true.

$625^2 = 25^x$

Lecture Video <

Solution Video

Question 63: Determine the value of the exponent that makes each statement true.

$27^4 = 3^x$

Lecture Video <

Solution Video

Question 64: Find the missing value with an integer.

a) $2^8 = 4^{\bigcirc}$

b) $2^7 = 4^{\bigcirc}$

Lecture Video

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Solution Video

Mid Chapter Review

Question 1: Express each of the following as a power with single exponent.

a) $(7^3)^5$

b) $(x^4)^6$

c) $(x^3)^2$

Lecture Video <

Solution Video

Question 2: Express each of the following as a power with a different base.

a) 16

b) 4^3

c) 9^4

Lecture Video <

Solution Video

Question 3: Express each of the following numbers with the base indicated:

32^3 with a base of 2

Lecture Video <

Solution Video

Question 4: Express each of the following numbers with the base indicated:

81^2 with a base of 9

Lecture Video <

Solution Video

Question 5: Express each of the following numbers with the base indicated:

81^2 with a base of 3

Lecture Video <

Solution Video

Question 6: Express each of the following numbers with the base indicated:

100^{15} with a base of 10

Lecture Video <

Solution Video

Question 7: Express each of the following as a power with a single exponent.

$(a)\ (3^4)^2$ $(c)\ (2^5)^3$ $(e)\ (x^2)^3$
$(b)\ (9^4)^3$ $(d)\ (10^6)^6$ $(f)\ (5^2)^4$

Lecture Video <

Solution Video

Question 8: Simplify

$[(\frac{8}{5})^3]^4$

Lecture Video <

Solution Video

Question 9: Simplify.

$5^3 5^6$

Lecture Video <

Solution Video

Question 10: Simplify.

$7^3 2^6 7^2 2^5$

Lecture Video <

Solution Video

Question 11: Simplify.

$(3.1)^8 (3.1)^2$

Lecture Video <

Solution Video

Question 12: Simplify.

$(-2)^3 (-2)^7$

Lecture Video <

Solution Video

Question 13: Simplify.

$$\frac{5^6}{5^2}$$

Lecture Video <

Solution Video

Question 14: Simplify.

$$\frac{(-\frac{2}{5})^{13}}{(-\frac{2}{5})^{7}}$$

Lecture Video <

Solution Video

Question 15: Simplify.

$$\frac{(0.012)^3}{0.012}$$

Lecture Video <

Solution Video

Question 16: Simplify.

$$\frac{7^3 7^6}{7}$$

Lecture Video <

Solution Video

Question 17: Simplify.

$$\frac{7^3 2^6}{7^2 2^5}$$

Lecture Video <

Solution Video

Question 18: Simplify.

$$(\frac{5}{7})^3(\frac{5}{7})^6$$

Lecture Video <

Solution Video

Question 19: Simplify.

x^2x^6

Lecture Video

Solution Video

<

Question 20: Simplify.

y^3y^6

Lecture Video

Solution Video

<

Question 21: Simplify.

$2^3x^22^2x^5$

Lecture Video

Solution Video

<

Question 22: Simplify.

$5^3y^3 5^3y^6$

Lecture Video <

Solution Video

Question 23: Simplify.

$\frac{m^6}{m^5}$

Lecture Video <

Solution Video

Question 24: Simplify.

$\frac{4^4m^6}{4m}$

Lecture Video <

Solution Video

Question 25: Simplify.

$$\frac{n^3 n^2}{n}$$

Lecture Video <

Solution Video

Question 26: Simplify.

$$ab^7 a^3 b^4$$

Lecture Video <

Solution Video

Question 27: Simplify.

$$\frac{x^5 y^6}{x^3 y}$$

Lecture Video <

Solution Video

Question 28: Simplify.

$$\frac{6^3 q^5 q^2}{6q^4}$$

Lecture Video

Solution Video

<

Question 29: The diameter of the Earth is about 1.3 X 104 km. The diameter of the Sun is about 1.4×10^6 km. About how many “Earths” could you line up along the Sun’s diameter?

Lecture Video

Solution Video

<

Question 30: Simplify

$$(4^3 \times 3^2)^2 \times (4^5 \times 3^2)^3$$

Lecture Video

Solution Video

<

Question 31: Simplify.

$(5^3)^5(5^4)^4$

Lecture Video <

Solution Video

Question 32: Simplify

$$\frac{(2^5 \times 5^2)^2}{(2^4 \times 5)^2}$$

Lecture Video <

Solution Video

Question 33: Simplify.

$(x^3)^4(x^5)^4$

Lecture Video <

Solution Video

Question 34: Simplify.

$(m^3)^4(2x^3)^7(m^3)^4(x^3)^7$

Lecture Video <

Solution Video

Question 35: Simplify.

$$\frac{(m^3)^4(2x^2)^7}{2^5(m^3)^3(x^3)^2}$$

Lecture Video <

Solution Video

Question 36: The length of the side of a cube is 3^5. Express its surface area (SA) and volume (V) using

powers and simplify.

Lecture Video <

Solution Video

Question 37: Express the area of each triangle as a monomial.

Lecture Video

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Solution Video

2.4 Adding and Subtracting Polynomials

Question 1: Draw an algebra tile representation of each polynomial.

$2x^2 - x$

Lecture Video <

Solution Video

Question 2: Draw an algebra tile representation of each polynomial.

$x^2 + 3$

Lecture Video <

Solution Video

Question 3: Draw an algebra tile representation of each polynomial.

$2y - 2x + 2$

Lecture Video <

Solution Video

Question 4: Copy each equation. Identify the like terms in each and circle their coefficients.

$a)\quad 3x, 4y, -2x \quad b)\quad 6m, -1.5m, 4n, 3m^2$

Lecture Video

Solution Video

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Question 5: Write an algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

<

Question 6: Write an algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

<

Question 7: Write an algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

Question 8: Draw an algebra tile representation of each polynomial.

$x^2 + 3x$

Lecture Video

Solution Video

Question 9: Draw an algebra tile representation of each polynomial.

$2x^2 - y^2$

Lecture Video

Solution Video

Question 10: Draw an algebra tile representation of each polynomial.

$xy + 4x$

Lecture Video <

Solution Video

Question 11: Draw an algebra tile representation of each polynomial.

$3x^2 - 3x - 4$

Lecture Video <

Solution Video

Question 12: Write a simplified algebraic expression for each algebra tile representation.

Lecture Video <

Solution Video

Question 13: Write a simplified algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

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Question 14: Write a simplified algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

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Question 15: Write a simplified algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

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Question 16: Write a simplified algebraic expression for each algebra tile representation.

Lecture Video

Solution Video

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Question 17: Simplify the following.

$2x + 3x$

Lecture Video

Solution Video

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Question 18: Simplify the following

$7y - 3y - x^2 + 4x^2$

Lecture Video

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Question 19: Simplify the following

$(2y^2 - 3y + 4) + (-5y^2 + 5y - 3)$

Lecture Video <

Solution Video

Question 20: Simplify the following

$(3y^2 - 2y + 1) - (-5y^2 + 2y - 3)$

Lecture Video <

Solution Video

Question 21: Simplify the following

$2y - 3y - x^2 + 3x^2$

Lecture Video <

Solution Video

Question 22: Simplify the following

$(y^2 - 2y + 2) - (3y^2 - 2y + 3)$

Lecture Video <

Solution Video

Question 23: Determine the polynomials that need to be added to each row of the table.

Initial Polynomial	Polynomial To Be Added	Final Polynomial
$-7xy + 4x$		$-7xy + 3x - 2$

Lecture Video <

Solution Video

Question 24: Determine the polynomials that need to be added to each row of the table.

Initial Polynomial	Polynomial To Be Added	Final Polynomial
$2x^2 - 3x - 4$		$-2x^2 + 3x - 6$

Lecture Video <

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Question 25: Simplify.

$3xy + 5yz - 2xyz + 6xy - xyz$

Lecture Video <

Solution Video

Question 26: Simplify the following.

$3x - 2y + 4x$

Lecture Video <

Solution Video

Question 27: Copy each question. Identify the like terms in each and circle the coefficients.

$-2g, 3f, -5g$

Lecture Video <

Solution Video

Question 28: Simplify the following

$(2x - 3y) + (3x + y)$

Lecture Video <

Solution Video

Question 29: Simplify the following

$(5x - 4y) - (3x + 2y)$

Lecture Video <

Solution Video

Question 30: Simplify.

$2x + 3y + 4z - 4x + 3y - z$

Lecture Video <

Solution Video

Question 31: Simplify the following.

$(2x+3)+(5x-4)$

Lecture Video <

Solution Video

Question 32: Simplify the following.

$(3x-5)+(-2x+6)$

Lecture Video <

Solution Video

Question 33: Simplify the following.

$(3x+2)-(5x+2)$

Lecture Video <

Solution Video

Question 34: Simplify.

$(2x + 3y) + (5x - 4y) + (2x - y)$

Lecture Video <

Solution Video

Question 35: Copy each question. Identify the like terms in each and circle the coefficients.

$5x, -2.1y^3, -0.8y^3, 2y$

Lecture Video <

Solution Video

Question 36: Simplify the following

$3h + 1 + 2h + 5$

Lecture Video <

Solution Video

Question 37: Simplify the following

$$\frac{3}{4}a - \frac{1}{5}b - \frac{1}{4}a + \frac{2}{5}b$$

Lecture Video <

Solution Video

Question 38: Simplify the following

$$(3x^2 - 4xy + 6y^2) + (6x^2 - 8xy - 3y^2)$$

Lecture Video <

Solution Video

Question 39: Simplify the following

$$(3x^2 - 4xy + 6y^2) - (6x^2 - 8xy - 3y^2)$$

Lecture Video <

Solution Video

Question 40: Simplify.

$$-(4ab-3a)-(6ab-4a)+(2ab+6a)$$

Lecture Video <

Solution Video

Question 41: Simplify.

$$(3xy+5y^2)-(3xy+5y^2)+(3xy+5y^2)$$

Lecture Video <

Solution Video

Question 42: Determine the polynomials that need to be added to each row of the table.

Initial Polynomial	Polynomial To Be Added	Final Polynomial
x^2+3x		$-x^2+5x$

Lecture Video <

Solution Video

Question 43: Determine the polynomials that need to be added to each row of the table.

Initial Polynomial	Polynomial To Be Added	Final Polynomial
$2x^2y^2 - 4y^2$		$5x^2y^2 - 3y^2$

Lecture Video <

Solution Video

Question 44: Simplify.

$-4abc - 3ab - 6abc - 4ab$

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Solution Video

Question 45: A pool table is always twice as long as it is wide. The Cue Ball Company makes pool tables in may different sizes. Each table top must have rubber bumpers around the outside edge and a felt top. The rubber bumpers cost $2.25/m and the felt material for the top costs $\$28/m^2$. Determine an algebraic expression that represents the total cost for feet and rubber for the table top. Use this to determine the cost of the materials for a top that has a width of 1.5m.

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Question 46: Jan is a plumber. She charges $35 to visit a job site. Her hourly rate is $43.50. Fred repairs furnaces. He charges $41 for a service call plus $38.75/h. Let x represent the number of hours they work.

- **a)** Represent Jan's bill as a polynomial.
- **b)** Represent Fred's bill as a polynomial.
- **c)** Write a new polynomial that represents Jan's and Fred's combined charge, assuming that they both work x hours at a site.
- **d)** Calculate their combined charge i they both work 8 h at the same complex.

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Question 47: Write a algebra expression for how much

a) How much does Elizabeth and Dragan make in total for t tables served.

b) How much does Elizabeth and Dragan make in total for 5 tables served.

	$Elizabeth$	$Dragan$
Average Weekly Tips	$\$220/table$	$\$160/table$
Room and Board	$\$160/week$	$\$125/week$

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Question 48: Simplify.

$$(3xy + 5y^2) - (3xy + 5y^2) + (3xy + 5y^2)$$

Lecture Video <

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2.5 Multiplying a Polynomial by a Monomial

Question 1: State the factors and product represented in each model as an algebraic equation.

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Question 2: State the factors and product represented in each model as an algebraic equation.

Lecture Video <

Solution Video

Question 3: What multiplication equation does each model represent?

Lecture Video <

Solution Video

Question 4: Expand.

$2a^3(4a^2 - a)$

Lecture Video <

Solution Video

Question 5: Expand using the tool or strategy of your choice.

$(3x + 5)(2x)$

Lecture Video <

Solution Video

Question 6: Expand.

$b^2(2b^3 - 4b + 1)$

Lecture Video <

Solution Video

Question 7: Expand.

$-4x(x^2 - 3x)$

Lecture Video <

Solution Video

Question 8: Expand.

$-2n^2(3n - 5 + 4n^3)$

Lecture Video <

Solution Video

Question 9: Find the missing value.

$-4a^3(\bigcirc + \bigcirc + \bigcirc) = -12a^7 + 4a^4 - 8a^3$

Lecture Video <

Solution Video

Question 10: Evaluate each statement for $p = 5$ once before you expand and once after you expand it.

$2p^2(4p + 3)$

Lecture Video

Solution Video

Question 11: Expand.

$-3x(xy + yz)$

Lecture Video

Solution Video

Question 12: Expand.

$-2(y^2 - y - 1)$

Lecture Video

Solution Video

Question 13: Expand.

$2(-y^2 - y - 1)$

Lecture Video <

Solution Video

Question 14: Expand using the tool or strategy of your choice.

$2(3x + 4)$

Lecture Video <

Solution Video

Question 15: Expand using the tool or strategy of your choice.

$4(5 + x)$

Lecture Video <

Solution Video

Question 16: Evaluate each statement for $p = 5$ once before you expand and once after you expand it.

$4(3p + 2)$

Lecture Video <

Solution Video

Question 17: Expand using the tool or strategy of your choice.

$3x(x + 2)$

Lecture Video <

Solution Video

Question 18: Find the missing value.

$\bigcirc(2x - 10) = 6x - 30$

Lecture Video <

Solution Video

Question 19: Evaluate each statement for $p = 5$ once before you expand and once after you expand it.

$3p(6 - p)$

Lecture Video <

Solution Video

Question 20: Expand using the tool or strategy of your choice.

$x(2x + 1)$

Lecture Video <

Solution Video

Question 21: What multiplication equation does each model represent?

Lecture Video <

Solution Video

Question 22: What multiplication equation does each model represent?

Lecture Video <

Solution Video

Question 23: Write simplified algebraic expressions for the perimeter, P, and area, A, of the following figures.

Lecture Video <

Solution Video

Question 24: Write simplified algebraic expressions for the perimeter, P, and area, A, of the following figures.

Lecture Video <

Solution Video

Question 25: Evaluate the perimeter and the area of the rectangle if $x = 4cm$

Lecture Video

Solution Video

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Question 26: Expand.

$3m^3(5m^2 + 6m - 4)$

Lecture Video

Solution Video

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Question 27: Find the missing value.

$\bigcirc(x^3 - 5x - 4) = 2x^5 - 10x^3 - 8x^2$

Lecture Video

Solution Video

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Question 28: Evaluate each statement for $p = 5$ once before you expand and once after you expand it.

$p(3p^2 - 4p + 4)$

Lecture Video <

Solution Video

Question 29: Expand.

$-(x^2 - 3x + 7)$

Lecture Video <

Solution Video

Question 30: Expand.

$2x(y - 3z)$

Lecture Video <

Solution Video

Question 31: Fill in the missing information to make the statements true.

$20x + 15 = 5(\bigcirc + \bigcirc)$

Lecture Video <

Solution Video

Question 32: Fill in the missing information to make the statements true.

$5x^2 + 25x = 5(\bigcirc + \bigcirc)$

Lecture Video <

Solution Video

Question 33: Factor the following expressions fully.

$12x^2 - 6x$

Lecture Video <

Solution Video

Question 34: Fill in the missing information to make the statements true.

$4x^5 + 8x^3 - 2x^2 = \bigcirc x^2(\bigcirc + \bigcirc + \bigcirc)$

Lecture Video

Solution Video

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Question 35: These polynomials were expanded using the distributive principle. Which of the following is the equivalent factored form?

$21y^3 + 7y^2 - 14y$

Lecture Video

Solution Video

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2.6 Simplifying Polynomial Expressions

Question 1: Simplify using the tool or strategy of your choice. Verify using a different tool or strategy.

$3(x-1)+2(2x+2)$

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Solution Video

Question 2: Simplify.

$3(x-1)+2(2x+2)$

Lecture Video <

Solution Video

Question 3: Simplify the following expression using the tool or strategy of your choice. Verify using a different tool or strategy.

$6(8+3c)+4(10+2c)$

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Solution Video

Question 4: Simplify the following expression using the tool or strategy of your choice. Verify using a different tool or strategy.

$5(2x-3)-4(3x+6)$

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Solution Video

Question 5: Simplify each expression, and then evaluate for $a=3$.

$6(2a+4)-3a$

Lecture Video <

Solution Video

Question 6: Simplify each expression, and then evaluate for $a=3$.

$15-2(a-5)$

Lecture Video <

Solution Video

Question 7: Simplify the following polynomial expressions.

$6(x+5)-2(x+4)+3(x-5)$

Lecture Video <

Solution Video

Question 8: Expand and simplify.

$-1.25(3.1m+2.2)-2.15(1.2m-3.2)$

Lecture Video <

Solution Video

Question 9: Simplify

$15-10(x-4)-(3x+3)$

Lecture Video <

Solution Video

Question 10: Simplify the following.

$5(2x - 3y) - 4(3x + 6y)$

Lecture Video <

Solution Video

Question 11: Simplify using the tool or strategy of your choice. Verify using a different tool or strategy.

$2(y^2 - 3) - 2(y^2 - 1)$

Lecture Video <

Solution Video

Question 12: Simplify.

$2(y^2 - 3) - 2(y^2 - 1)$

Lecture Video <

Solution Video

Question 13: Simplify the following expression using the tool or strategy of your choice. Verify using a different tool or strategy.

$2(x^2 - 3x + 6) - 3(2x^2 - 4x - 1)$

Lecture Video <

Solution Video

Question 14: Simplify the following expression using the tool or strategy of your choice. Verify using a different tool or strategy.

$2(3y^2 + 4y) - 3(2y^2 - y)$

Lecture Video <

Solution Video

Question 15: Simplify the following expression using the tool or strategy of your choice. Verify using a different tool or strategy.

$2(4x^3 - 3x + 6) + 3(2x^5 + x^3 - 4x)$

Lecture Video <

Solution Video

Question 16: Simplify the following polynomial expressions.

$3(2x^2 - 1) + 6(2x - 3) - (2x^2 - 5x)$

Lecture Video <

Solution Video

Question 17: Simplify the following polynomial expressions.

$3(2y^2 - 1) + 6(2y - 3) - (2y^2 - 5y)$

Lecture Video <

Solution Video

Question 18: Simplify the following polynomial expressions.

$3(4p^2 - 2p + 6) + 6(4p - 2) - (7p^2 + 5p + 1)$

Lecture Video <

Solution Video

Question 19: Simplify the following.

$2(x^2 - 3xy + 6y) - 3(2x^2 - 4xy - y)$

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Question 20: On average, the following numbers of adults and children pay to enter the fall fair.

Determine an expression for the total entrance fees collected la hours after opening.

	$Adults$	$Children$
$At 9 a.m.$	20	25
Each Hour After 9 a.m. Until Closing	95	120

FALL FAIR 9 a.m. -10 p.m. Children: $\$8.00$ Adults: $\$12.00$

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Question 21: Write an algebraic representation that corresponds to the algebra tile model shown. Simplify the expression using the strategy of your choice.

Lecture Video

Solution Video

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Question 22: Write an algebraic representation that corresponds to the algebra tile model shown. Simplify the expression using the strategy of your choice.

Lecture Video

Solution Video

Question 23: Write an algebraic representation that corresponds to the algebra tile model shown. Simplify the expression using the strategy of your choice.

Lecture Video

Solution Video

Question 24: Mary is making rectangular picture frames to the proportions shown.

Determine the outside perimeter when $x = 5$cm.

Lecture Video

Solution Video

Question 25: Mary is making rectangular picture frames to the proportions shown.

Determine a simplified expression for the area of one picture frame.

Lecture Video

Solution Video

Question 26: Mary is making rectangular picture frames to the proportions shown.

Determine the area of one frame when $x = 5$ cm.

Lecture Video

Solution Video

Question 27: Mary is making rectangular picture frames to the proportions shown.

Determine a simplified expression for the number of square centimeters of wood needed to make 20 frames the same size. Assume there is no waste.

Lecture Video

Solution Video

Question 28: Simplify the following expression using the tool or strategy of your choice. Verify using a different tool or strategy.

$-y(y^2+5y+4)+3y(2y^2-y+6)$

Lecture Video <

Solution Video

Question 29: Simplify the following polynomial expressions.

$4x^2(x^3-2x^2)+2x^3(2x^2+2x)$

Lecture Video <

Solution Video

Question 30: Simplify the following polynomial expressions.

$2y^2(y^3-3y^5)-3(y^2-y^5)$

Lecture Video <

Solution Video

Question 31: Simplify the following polynomial expressions.

$3m^3(2m^2 - 5m + 3) - 4m(m^4 + 2m^3 - m^2)$

Lecture Video <

Solution Video

Question 32: Simplify the following polynomial expressions.

$-5x(x^3 - 2x^2) + 2x^2(3x^2 - 5x) - 4x^3(x - 2)$

Lecture Video <

Solution Video

Question 33: Simplify the following.

$x(x + y) + 2x(x - y)$

Lecture Video <

Solution Video

Question 34: Simplify each expression, and then evaluate for $a = 3$.

$-10a - 2(a^2 + 7)$

Lecture Video <

Solution Video

Question 35: Simplify each expression, and then evaluate for $a = 3$.

$-(2a - a^3) - a^2$

Lecture Video <

Solution Video

Question 36: Expand and simplify.

$\frac{3}{5}\left(2\frac{1}{3}a - 2\frac{1}{2}\right) - \frac{1}{2}\left(2\frac{1}{5}a + 3\frac{2}{3}\right)$

Lecture Video <

Solution Video

Question 37: Expand and simplify.

$$\frac{1}{6}\left(3\frac{1}{5}a+\frac{2}{3}b\right)+\frac{1}{3}\left(\frac{1}{2}a-\frac{1}{2}\right)$$

Lecture Video <

Solution Video

Question 38: Mary is making rectangular picture frames to the proportions shown.

Determine a simplified expression for the outside perimeter of the frame.

Lecture Video <

Solution Video

Question 39: Apply the distributive property to simplify the following.

$$(x+3)(2x+4)$$

Lecture Video

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Solution Video

Question 40: Apply the distributive property to simplify the following.

$(y+2)(y+1)$

Lecture Video <

Solution Video

Question 41: Apply the distributive property to simplify the following.

$(2x+y)(x+y)$

Lecture Video <

Solution Video

Question 42: Simplify

$(x-3)(x+4)+3(x^2-x+2)$

Lecture Video <

Solution Video

Question 43: Simplify

$(2x+y)(x-y)-(x^2+y^2)$

Lecture Video <

Solution Video

Question 44: Simplify

$(3x+5)(2x-4)+(x+1)(2x+5)$

Lecture Video <

Solution Video

Chapter Review of Polynomials

Question 1: Sketch models to represent each of the following algebraic expressions. The variables x and y are not equal.

y^2

Lecture Video <

Solution Video

Question 2: Sketch models to represent each of the following algebraic expressions. The variables x and y are not equal.

y^3

Lecture Video <

Solution Video

Question 3: Sketch models to represent each of the following algebraic expressions. The variables x and y are not equal.

$2x$

Lecture Video <

Solution Video

Question 4: Sketch models to represent each of the following algebraic expressions. The variables x and y are not equal.

$(2x)^2$

Lecture Video <

Solution Video

Question 5: Rob is finishing a floor with square tiles. Each tile has an area of $412cm^2$. Estimate the length of the side of each tile.

Lecture Video <

Solution Video

Question 6: If you know that the product of two numbers is 9^6 and quotient is 9^2, which of the following could be the two numbers?

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Solution Video

Question 7: The length of the side of a cube is 5^3. Express its surface area (SA) and volume (V) using powers and simplify each expression.

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Solution Video

Question 8: Why do you get the same result for each of the following expressions? Show your work using Exponent Laws.

(a) $\dfrac{5^7}{5^4}$

(b) $\dfrac{5^6}{5^3}$

(c) $\dfrac{(5^4)(5^5)}{5^6}$

(d) $\dfrac{(5^4)(5)}{(5)(5)}$

Lecture Video <

Solution Video

Question 9: Simplify, and then evaluate for $x = -2$ and $y = 3$

$$\frac{(x^3)(x^4)}{x^6}$$

Lecture Video <

Solution Video

Question 10: Simplify, and then evaluate for $x = -2$ and $y = 3$

$$\frac{(y^6)(x^4)}{(x^2)(y^4)}$$

Lecture Video <

Solution Video

Question 11: Simplify, and then evaluate for $x = -2$ and $y = 3$

$$\frac{-32x^6}{16x^3}$$

Lecture Video <

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Question 12: About how long does it take for light to travel from one end of our galaxy to the other?

- It is about $9.5 \times 10^6 km$ from one end of our galaxy to the other.
- Light travels at about $1.1 \times 10^9 km/h$.

Lecture Video <

Solution Video

Question 13: Simplify.

$(a^3)^2$

Lecture Video <

Solution Video

Question 14: Simplify.

$\frac{(2^3y^4)^3}{(2^4y^3)^2}$

Lecture Video <

Solution Video

Question 15: Which of the following is equal to 0?

- a)$(10^3)^5 - (10^5)^3$
- b) $(9^2)^2 - (3^4)^2$

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Question 16: Express each of the following as a power with a prime base.

8^3

Lecture Video

Solution Video

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Question 17: Express each of the following as a power with a prime base.

25^4

Lecture Video

Solution Video

<

Question 18: Express each of the following as a power with a prime base.

9^3

Lecture Video

Solution Video

<

Question 19: Simplify.

$5y - 4y$

Lecture Video <

Solution Video

Question 20: Simplify.

$\frac{4}{5}a - \frac{1}{5}a$

Lecture Video <

Solution Video

Question 21: Simplify.

$3xy^2 + 3xy^2$

Lecture Video <

Solution Video

Question 22: Simplify.

$2x^2 - 5x + 5x^2 - x$

Lecture Video <

Solution Video

Question 23: Simplify.

$y^2 + 5xy + y^2 - xy$

Lecture Video <

Solution Video

Question 24: Simplify.

$2\frac{1}{2}a + \frac{2}{3}b + \frac{1}{2}a - \frac{1}{3}b$

Lecture Video <

Solution Video

Question 25: Simplify.

$-1.75m + 2.7 - 2.25m + 2.3$

Lecture Video <

Solution Video

Question 26: Expand. check one of your answer using a different tool or strategy.

$3(y - 2)$

Lecture Video <

Solution Video

Question 27: Expand. check one of your answer using a different tool or strategy.

$x(2x + 4)$

Lecture Video <

Solution Video

Question 28: Expand.

$-1.5m(2.8m + 2.2)$

Lecture Video <

Solution Video

Question 29: Expand. check one of your answer using a different tool or strategy.

$5m(3m^3 + 2n)$

Lecture Video <

Solution Video

Question 30: Expand. check one of your answer using a different tool or strategy.

$-3x(x^2 - x)$

Lecture Video <

Solution Video

Question 31: Expand. check one of your answer using a different tool or strategy.

$2y^3(y^3 + 3y^2 - y)$

Lecture Video <

Solution Video

Question 32: Expand. check one of your answer using a different tool or strategy.

$-a^2(2a - 5a^2 + 4a^3)$

Lecture Video <

Solution Video

Question 33: Expand.

$\frac{1}{3}(3x + 12)$

Lecture Video <

Solution Video

Question 34: Expand and simplify. Check one of your answers using a different tool or strategy.

$2(x-3)+3(x+2)$

Lecture Video <

Solution Video

Question 35: Expand.

$\frac{2}{5}(\frac{5}{8}a+10b)$

Lecture Video <

Solution Video

Question 36: Expand and simplify.

$\frac{1}{4}(8x-12)-\frac{1}{2}(6-14x)$

Lecture Video <

Solution Video

Question 37: Expand and simplify.

$$\frac{5}{6}(6x - 18y) + \frac{2}{3}(21x - 6y)$$

Lecture Video <

Solution Video

Question 38: Expand and simplify.

$$\frac{5}{6}(6x - 18y) + \frac{2}{3}(21x - 6y)$$

Lecture Video <

Solution Video

Question 39: Rick runs a pet store and is building rectangular pens for the animals. The length of the pens is always 20 cm longer than the width.

(a) One way of determining the perimeter is to use $P = 2(l + w)$. Use this formula to create an expression for the perimeter in terms of x.

(b) Simplify your formula in part (a).

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Question 40: Rick runs a pet store and is building rectangular pens for the animals. The length of the pens is always 20 cm longer than the width.

- Find the perimeter of a pen with a width of 45 cm.

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Question 41: Ms. Smith needs fabric pieces for an art project for her students. The pieces will be cut to two rectangular sizes, as shown.

Determine a simplified expression for the area of fabric needed if 14 students choose the larger size and 12 choose the smaller size.

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Question 42: Ms. Smith needs fabric pieces for an art project for her students. The pieces will be cut to two rectangular sizes, as shown.

The class decides that the width of each piece of fabric will be 20 cm. Use your answer from part a) to determine how much material will be needed.

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Solution Video

Question 43: Expand and simplify. Check one of your answers using a different tool or strategy.

$3(y^2 + y - 2) - (y^2 + 2y + 4)$

Lecture Video <

Solution Video

Question 44: Expand and simplify. Check one of your answers using a different tool or strategy.

$2x(3x - 2) + x^2 + 2(x^2 + 3)$

Lecture Video <

Solution Video

Question 45: Expand and simplify. Check one of your answers using a different tool or strategy.

$3x(4x^2 - 5x) + x^3 - x^2$

Lecture Video <

Solution Video

Question 46: Mike has a baseball card collection. He is wondering about the future value of his rookie and big star cards.

Write an expression that represents the combined value of these cards in y years.

$CardType$	$NumberofCards$	$ValueToday$	$IncreaseinValueperYear$
$Rookiecards$	22	$\$15$	$\$3$
$Bigstarcards$	18	$\$12$	$\$2$

Lecture Video

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Solution Video

Question 47: Mike has a baseball card collection. He is wondering about the future value of his rookie and big star cards.

Determine the combined value of the cards in 6 years.

$CardType$	$NumberofCards$	$ValueToday$	$IncreaseinValueperYear$
$Rookiecards$	22	$\$15$	$\$3$
$Bigstarcards$	18	$\$12$	$\$2$

Lecture Video

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Practice Test on Algebra and Powers

Question 1: Sketch and label a representation for each of the following algebraic terms. Explain how your sketches are both alike and different.

a) y^2

b) m

c) m^3

Lecture Video <

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Question 2: Jacqueline is making a quilt using finished squares like the one shown. Each square has an area of 310 cm^2.

a) Write an expression that represents the length of the side of the square in terms of its area.

b) Estimate the length. Describe the process you used.

c) Use a calculator to determine the correct length to two decimal places.

Lecture Video <

Solution Video

Question 3: Determine the approximate length of the roadway bordering the adjacent square properties.

Lecture Video <

Solution Video

Question 4: Simplify

$3^4 3^6$

Lecture Video <

Solution Video

Question 5: Simplify

$$\frac{(\frac{4}{5})^6}{(\frac{4}{5})^5}$$

Lecture Video <

Solution Video

Question 6: Simplify

$$\frac{x^3 x^6}{x}$$

Lecture Video <

Solution Video

Question 7: Simplify

$6.1(6.1^6)(6.1^5)(5^2)$

Lecture Video <

Solution Video

Question 8: Simplify

$(-7)^4(-7^6)$

Lecture Video <

Solution Video

Question 9: Simplify

a) $(6^3)^2$

b) $(x^2)^5$

Lecture Video <

Solution Video

Question 10: Simplify

$[(\frac{2}{5})^4]^5$

Lecture Video <

Solution Video

Question 11: Simplify

$(y^3)^2(y^5)^2$

Lecture Video <

Solution Video

Question 12: Simplify

$(\frac{2}{x^2})^2$

Lecture Video <

Solution Video

Question 13: Simplify.

$5x - 2x$

Lecture Video <

Solution Video

Question 14: Simplify.

$7xy + 2xy$

Lecture Video <

Solution Video

Question 15: Simplify.

$(3x^2 - 5a) + (4x^2 - a)$

Lecture Video <

Solution Video

Question 16: Which expression below is equivalent to $(y^2 + 5y) - (3y^2 - y)$?

A $-2y^2 + 6y$

B $4y^2 + 4y$

C $2y^2 + 6y$

D $-2y^2 + 6y$

E none of the above

Lecture Video <

Solution Video

Question 17: Expand.

$2(x - 3)$

Lecture Video <

Solution Video

Question 18: Expand.

$3x(4x^2 - 5x)$

Lecture Video <

Solution Video

Question 19: Expand.

$y^5(5y^4 + 3y^3 - y^2)$

Lecture Video <

Solution Video

Question 20: Expand and simplify.

$2(x - 3) + 3(x + 2)$

Lecture Video <

Solution Video

Question 21: Expand and simplify.

$3(y^2 + y - 2) - (y^2 + 2y + 4)$

Lecture Video <

Solution Video

Question 22: Expand and simplify.

$2x(3x-2)+x^2+0.2(x^2+3)$

Lecture Video <

Solution Video

Question 23: Mary and Bill are setting up a summer concession stand at the park. They need these jobs filled:

$Position$	Number of Positions	Hourly Pay Rate and Weekly Bonus
$Manager$	3	$\$14/\text{h plus } \$50\text{bonus per week for working at least 30 h}perweek$
$Server$	8	$\$9/\text{h plus } \$35\text{bonus per week for working at least 30 h}perweek$

a) Determine a simplified algebraic expression to represent the weekly payroll for all 11 employees. Assume that they will always work at least 30 h per week.

b) Use your expression to determine the weekly payroll if each employee works 32 h per week.

Lecture Video <

Solution Video

Question 24: Determine an expression that simplifies to $3x^2$ if the expression contains:

- exactly two binomials
- the distributive property used once

Lecture Video <

Solution Video

Chapter 3 Linear Relations

3.1 Relations

Question 1: Describe a relation between the figure number and the total number of squares using a table of values, a graph, and an equation.

Lecture Video <

Solution Video

Question 2: Describe each relation with either a table of values or an equation.

Lecture Video <

Solution Video

Question 3: This pattern is made of equilateral triangles with sides of 1 cm.

- Graph the relation between a figure and its perimeter.
- Determine the perimeter of figure 10. Explain your reasoning.
- Graph the relation between number and the number of white triangles in the figure.
- Determine the numbers of white triangles in figure 10. Explain.

Lecture Video <

Solution Video

Question 4: Describe each relation using a table of values or an equation.

- **(a)** The perimeter of an equilateral triangle in terms of its side length
- **(b)** The amount John pays for a taxi ride, if the fare is $\$0.50/km$ plus a flat rate of $\$2.50$

Lecture Video <

Solution Video

Question 5: Graph each relation.

$Time(min)$	$Distance(km)$
0	15
5	18
10	21
15	24

Lecture Video <

Solution Video

Question 6: Graph each relation.

$SideLength(\text{cm})$	$Area\ (\text{cm}^2)$
1	1
2	4
3	9
4	16

Lecture Video <

Solution Video

Question 7: Graph each relation.

x	y
-2	-4
-1	-2
0	0
1	2

Lecture Video <

Solution Video

Question 8: Describe each relation using an equation.

$Time(min)$	$Distance(km)$
0	15
5	18
10	21
15	24

Lecture Video <

Solution Video

Question 9: Describe each relation using an equation.

x	y
-2	-4
-1	-2
0	0
1	2

Lecture Video <

Solution Video

Question 10: Elyse is training for a race. The table shows her times and distances.

$Time(\text{min})$	$Distance(\text{km})$
0	0
10	2
20	4
30	6

- **(a)** Which variable is independent and which is dependent?
- **(b)** Estimate the distance Elyse has run after 22 min.
- **(c)** Describe the relation using a graph.
- **(d)** Verify your estimate in part (b)

Lecture Video <

Solution Video

Question 11: Describe each relation with either a table of values or an equation.

Lecture Video <

Solution Video

Question 12: The relation between Celsius and Fahrenheit is $C = \frac{5}{9}(F - 32)$.

- Which variable is independent in this equation? Justify your choice.
- Describe the relation using a table of values.
- Graph the relation.
- Are the data continuous or discrete?
- Estimate the Celsius temperature when $F = 100$ using your graph.
- Calculate the Celsius temperature when $F = 100$ using the equation.
- Why might you predict a value using an equation, instead or a table?

Lecture Video <

Solution Video

Question 13: These ordered pairs show the relation between the amount of cell phone use in minutes and the cost, in dollars: (0,25), (10, 26), (20, 27)

- Explain why cost is the dependent variable and what the ordered pair (0,25) means.
- Graph the relation.
- Are the data continuous or discrete?
- Describe the relation using an equation.
- Would you predict the cost of 100 min using a graph, or using an equation? Explain.
- Predict the cost of 100 min.

Lecture Video <

Solution Video

Question 14: Antwan charges $\$5/h$, plus a flat fee of $\$8$, in his lawn-mowing business.

a) Describe the relation between earning and hours using an equation.

b) Justify your choice for independent and dependent variables.

Lecture Video <

Solution Video

Question 15: A van's gas tank holds 75 L. The van uses 0.125L/km.

a) Describe the relation between the distance the van travels and the volume of gas in its tank.

b) How far can the van travel on a full tank of gas?

Lecture Video <

Solution Video

Question 16: Is the point on the graph of $y = 5x$?

$(0, 0)$

Lecture Video <

Solution Video

Question 17: Is the point on the graph of $y = 5x$?

$(2, 10)$

Lecture Video <

Solution Video

Question 18: Represent each relation using a table of values and a graph.

$y = x$

Lecture Video <

Solution Video

Question 19: Represent each relation using a table of values and a graph.

$y = 2x + 3$

Lecture Video <

Solution Video

Question 20: Represent each relation using a table of values and a graph.

$y = -x + 1$

Lecture Video <

Solution Video

Question 21: Represent each relation using a table of values and a graph.

$y = 0.25x - 3.5$

Lecture Video <

Solution Video

Question 22: Represent each relation using a table of values and a graph.

$y = -\frac{1}{2}x$

Lecture Video

Solution Video

<

Question 23: Represent each relation using a table of values and a graph.

$$y = -\frac{2}{3}x + \frac{1}{6}$$

Lecture Video

Solution Video

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Question 24: Claire has $50 in her piggy bank. She takes $2.50 from it each week to buy a hot chocolate a banana from the cafeteria. Create a table of values, a graph, and an equation to describe the amount of money in the piggy bank each week.

Lecture Video

Solution Video

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Question 25: Describe each relation in words.

$I = 2.54c$, where I is inches and c in centimetres

Lecture Video <

Solution Video

Question 26: Describe each relation in words.

$F = \frac{9}{5}C + 32$, where F is degrees Fahrenheit and C is degrees Celsius

Lecture Video <

Solution Video

Question 27: Describe each relation in words.

$k = \frac{p}{2.2}$, where p is pounds and k is kilograms

Lecture Video <

Solution Video

Question 28: Describe each relation in words.

$K = C + 273$, where K is degrees Kelvin and C is degrees Celsius

Lecture Video

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Solution Video

Question 29: **a)** Graph $y = 2x + 2$, $y = 3x$, and $y = 3x - 1$ on the same axes.

b) How do the equations tell you whether the graph will pass through the origin?

Lecture Video

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Solution Video

3.2 Exploring Linear Relations

Question 1: Identify each relation as a direct or a partial variation. Support your answer using a table, a graph, and form of the equation.

a) $y = 2x$

b) $y = 2x + 3$

c) $y = 1 - x$

d) $y = 0.25x - 3.5$

e) $y = -\frac{1}{2}x$

f) $y = -\frac{2}{3}x + \frac{1}{6}$

Lecture Video <

Solution Video

Question 2: Students can choose from two different cafeteria milk plans.

Plan A: Pay $\$0.75$ per glass of milk

Plan B: Pay $\$10$, plus $\$0.25$ per glass of milk

a) Write an equation for each plan.

b) Determine the cost of 20 glasses for each plan.

c) Determine the cost of 30 glasses for each plan.

d) Which plan would you choose? Why?

e) Identify each plan as a direct or a partial variation.

f) How does the type of variation affect the cost?

Lecture Video <

Solution Video

Question 3: A small rocket is launched from a hill 1500 m above sea level. It rises at 35 m/s.

a) Write an equation for the relation between the height of the rocket and time.

b) Use a table of values to graph this relation.

Lecture Video

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Solution Video

3.3 Investigating Properties of Linear Relations

Question 1: Which of these relations are linear? How do you know?

a)

x	y
1	3
2	6
3	9
4	12

b)

c)

x	y
1	1
2	4
3	9
4	16

d)

Lecture Video <

Solution Video

Question 2: Determine the rate of change.

x	y
1	3
2	6
3	9
4	12

Lecture Video <

Solution Video

Question 3: Determine the rate of change.

Lecture Video

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Solution Video

Question 4: Determine the rate of change.

x	y
1	1
2	4
3	9
4	16

Lecture Video <

Solution Video

Question 5: Determine the rate of change.

x	y
2	11
4	17
6	23
8	29
10	35

Lecture Video <

Solution Video

Question 6: Determine the rate of change.

x	y
5	0
4	2
3	4
2	6
1	8

Lecture Video <

Solution Video

Question 7: Determine the rate of change.

x	y
0	0
0.25	2
0.5	4
0.75	6
1	8

Lecture Video <

Solution Video

Question 8: Determine the rate of change.

x	y
1	-2
4	-8
5	-10
3	-6
2	-4

Lecture Video <

Solution Video

Question 9: Determine the rate of change.

Lecture Video <

Solution Video

Question 10: What is the slope of this roof?

Lecture Video <

Solution Video

Question 11: There are three steps from the ground to a front porch 72 cm above the ground, as shown.

a) What is the rise of each step?

b) The horizontal distance across each step is 25 cm. Determine the length of AB.

c) Determine the slope of the handrail.

Lecture Video <

Solution Video

Question 12: Determine the slope of the line that passes through each pair of points.

- $(3, 3)$ and $(-2, 2)$

Lecture Video <

Solution Video

Question 13: Determine the slope of the line that passes through each pair of points.

- $(21, -10)$ and $(20, 24)$

Lecture Video <

Solution Video

Question 14: Determine the slope of the line that passes through each pair of points.

- $(1, -1)$ and $(2, 2)$

Lecture Video <

Solution Video

Question 15: Determine the slope of the line that passes through each pair of points.

- $(-3, -8)$ and $(-5, -6)$

Lecture Video <

Solution Video

Question 16: Determine the slope of the line that passes through each pair of points.

- $(4, 0)$ and $(6, 18)$

Lecture Video <

Solution Video

Question 17: Use the title and axis labels of each graph to tell what the y—intercept and slope mean in each case.

Lecture Video <

Solution Video

Question 18: Determine two more ordered pairs for each relation. Explain your reasoning.

rise is 2, run is 3; $(2, 5)$ lies on the line

Lecture Video <

Solution Video

Question 19: Determine two more ordered pairs for each relation. Explain your reasoning.

rise is -3, run is 4; $(0, -2)$ lies on the line

Lecture Video <

Solution Video

Question 20: Determine two more ordered pairs for each relation. Explain your reasoning.

rise is -2, run is 1; $(-2, -3)$ lies on the line.

Lecture Video <

Solution Video

Question 21: Determine two more ordered pairs for each relation. Explain your reasoning.

rise is 5, run is 1; $(1, -6)$ lies on the line

Lecture Video <

Solution Video

Question 22: Write a linear equation for each line.

- a line with a slope of 2 that passes through (4, 1)

Lecture Video <

Solution Video

Question 23: Write a linear equation for each line.

- a line with a slope of $-\frac{1}{2}$ that passes through (3, 0)

Lecture Video <

Solution Video

Question 24: **a)** Graph the data in the table to the left.

b) How does the graph show the rate of change?

c) Estimate the air pressure at an altitude of 20 km.

$Altitude(\mathbf{km})$	$AirPressure(\mathbf{Pa})$
1	80000
3	60000
6	40000
16	20000
22	10000
30	5000

Lecture Video <

Solution Video

Question 25: Graph each relation and state the slope.

$y = 3x$

Lecture Video <

Solution Video

Question 26: Graph each relation and state the slope.

$y = -2x$

Lecture Video <

Solution Video

Question 27: Graph each relation and state the slope.

$y = -x$

Lecture Video <

Solution Video

Question 28: Graph each relation and state the slope.

$$y = \frac{3}{4}x + 1$$

Lecture Video <

Solution Video

Question 29: Graph each relation and state the slope.

$$y = -\frac{1}{5}x + 1$$

Lecture Video <

Solution Video

Question 30: Graph each relation and state the slope.

$$y = \frac{2}{3}x - 4$$

Lecture Video <

Solution Video

Question 31: An equation for a house's value is $y = 7500x + 125000$, where y is the value in dollars and x is the time in years, starting now.

a) What is the current value of the house?

b) What is the value of the house 2 years from now?

c) Determine the value of the house in 7 years.

d) At what rate is the house value changing from year to year?

Lecture Video <

Solution Video

Question 32: The amount of money in Alexander's account is $y = 4000 - 70x$, where y is the amount in dollars and x is the time in weeks.

a) Which variable is independent and which is dependent?

b) How do you know the relation is linear?

c) Determine the rate of change of the money in Alexander's account.

d) What does the rate of change mean?

e) How does the rate of change relate to the equation?

f) When will Alexander's account be empty?

Lecture Video <

Solution Video

Question 33: This graph shows the maximum heart rate a person should try to achieve while exercising.

a) What does the y-intercept mean?

b) What does the slope represent?

c) Write an equation for the line.

d) Estimate the maximum heart for a 58 year old.

Lecture Video

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Solution Video

Question 34: This graph shows the maximum heart rate a person should try to achieve while exercising.

a) What does the y-intercept mean?

b) What does the slope represent?

c) Write an equation for the line.

d) Estimate the maximum heart rate for a 58-year-old.

Lecture Video <

Solution Video

Question 35: Marie earns $1 for every 4 papers she delivers.

a) Show that the relation between papers delivered and money earned is linear, using a graph and a table of values.

b) What do the first differences mean?

c) What is the rate of change of Marie's earnings?

d) Predict Marie's earnings for delivering 275 papers using an equation.

Lecture Video <

Solution Video

Question 36: Write a linear equation for each line.

- a line with a y-intercept of 2 and a slope of $\frac{3}{5}$

Lecture Video

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Solution Video

Question 37: Write a linear equation for each line.

- a line with a y-intercept of 0 and a slope of -4

Lecture Video <

Solution Video

Question 38: Write a linear equation for each line.

- a line with a y-intercept of 2 and a slope of $\frac{3}{5}$

Lecture Video <

Solution Video

Question 39: Write a linear equation for each line.

- a line that passes through (0, 5) and (3, 6)

Lecture Video <

Solution Video

Mid Chapter Review on Linear Relations

3.4 Equivalent Linear Relations

Question 1: Graph the relation using the x and y-intercepts.

$-3x + 2y = 6$

Lecture Video <

Solution Video

Question 2: Graph each relation using the x and y-intercepts.

$\frac{1}{2}x + \frac{2}{3}y = \frac{1}{6}$

Lecture Video <

Solution Video

Question 3: Graph each relation using the x- and y-intercepts.

$y = 2x - 1$

Lecture Video <

Solution Video

Question 4: Maria works at a boutique and at a travel agency. In all, she works for 38 h per week.

(a) Write a linear relation to model this case. Use x for the number of hours she works at the boutique, and y for the number of hours she works at the travel agency.

(b) What do the x- and y-intercepts mean?

Lecture Video <

Solution Video

Question 5: Locate three points on the line $6x - y = 18$, where x and y are both integers, and draw the line.

Lecture Video <

Solution Video

Question 6: Graph each relation using the $x-$ and $y-$intercepts.

$2x - 5y = 10$

Lecture Video <

Solution Video

Question 7: Graph each relation using the $x-$ and $y-$intercepts.

$4x + 5y = 20$

Lecture Video <

Solution Video

Question 8: Graph each relation using the $x-$ and $y-$intercepts.

$x + y = 0$

Lecture Video <

Solution Video

Question 9: Graph the relation using the x- and y-intercepts and slope.

$2x + 3y = 0$

Lecture Video <

Solution Video

Question 10: Graph each relation using the x- and y-intercepts.

$$2x + \frac{4}{5}y = 11$$

Lecture Video <

Solution Video

Question 11: Graph each relation using the x-and y-intercepts.

$$\frac{1}{4}x - \frac{2}{3}y = 1$$

Lecture Video <

Solution Video

Question 12: Graph each relation using the x- and y - intercepts.

$$-\frac{5}{6}x + y = -\frac{1}{3}$$

Lecture Video <

Solution Video

Question 13: The relation $y = 2x^2 - 8$ is not linear. It has two x-intercepts and one y-intercept.

(a) What is the y-coordinate for both x-intercepts?

(b) Calculate the x—intercepts.

(c) Calculate the y-intercept.

(d) Create a table of values and graph $y = 2x^2 - 8$ to verify your answers to parts b) and c).

Lecture Video <

Solution Video

Question 14: Nicolas has $14.50 in quarters and dimes.

a. Explain why $0.10x + 0.25y = 14.50$ models this case.

b. Is this relation linear? Explain.

c. Determine the x— and y—intercepts. What do they mean?

d. Are the data continuous or discrete? Explain.

Lecture Video <

Solution Video

Question 15: Amir earns $9/h working in a coffee shop and $11.25/h working in a grocery store. Last week he earned $288.

a) Explain why $9x + 11.25y = 288$ models this case.

b) Is this relation a straight line? Explain.

c) Determine the x- and y-intercepts. What do they mean?

d) For how many hours might Amir have worked in each place?

Lecture Video <

Solution Video

Question 16: A boat travels down the St. Lawrence River at 30 km/h and moors at a spot where the passengers can watch whales. After a while, it travels back up the river to its starting point at 20 km/h. The boat travels 60 km in all.

a) Explain why $30x + 20y = 60$ models this problem. Explain what x and y represent.

b) Determine the x- and y-intercepts. What do they mean?

c) Graph the relation.

Lecture Video <

Solution Video

Question 17: Two airplanes appear on the same radar screen with a coordinate grid The path of one plane is $y = \frac{2}{5}x - 2$ and the path of the other is

$2x - 5y - 7 = 0$. Do the paths cross?

Lecture Video <

Solution Video

Question 18: Henry charges $3 to sharpen a pair of figure skates and 2.50 to sharpen a pair of hockey skates. Last Sunday, he earned $240.

Determine two possible numbers of pairs of figure skates and hockey skates that Henry could have sharpened.

Lecture Video <

Solution Video

Question 19: Henri charges $\$3$ to sharpen a pair of figure skates and $\$2.50$ to sharpen a pair of hockey skates. Last Sunday, he earned $\$240$.

Henri sharpened 94pairs of skates. How many of each type did he sharpen to earn $\$240$?

Lecture Video <

Solution Video

Question 20: Julia is preparing a mix of raisins and nuts for her brother's party. Chocolate raisins are $\$0.88/100g$ and peanuts are $\$1.00/100g$.

She plans to spend $\$3.00$ on the mix.

a) Explain why $0.88x + 1y = 3$ models this case.

b) Determine the $x-$ and $y-$ intercepts. What do they mean?

c) Graph the relation.

Lecture Video <

Solution Video

Question 21: Jennifer decides to invest $\$1200$ in mutual funds. One stock is $\$3.50/share$ and the other is $\$5.75/share$. How many shares of each stock can she buy? Give two possible answers.

Lecture Video <

Solution Video

Question 22: Write each equation in $y = mx + b$ form.

$4x + 2y = 8$

Lecture Video <

Solution Video

Question 23: Write it in $y = mx + b$ form.

$x + y = 2$

Lecture Video <

Solution Video

Question 24: Write each equation in $y = mx + b$ form.

$3x - 4y + 1 = 0$

Lecture Video <

Solution Video

Question 25: Write the equation of each line in the form $Ax + By = C$.

$x-$intercept 4, $y-$intercept -2

Lecture Video <

Solution Video

Question 26: Write the equation of each line in the form $Ax + By = C$.

$x-$intercept $\frac{1}{2}$, $y-$intercept $\frac{3}{4}$

Lecture Video <

Solution Video

Question 27: Write the equation of each line in the form $Ax + By = C$.

$x-$intercept $\frac{1}{2}$, $y-$intercept -3

Lecture Video <

Solution Video

Question 28: Write the equation of each line in the form $Ax + By = C$.

$x-$intercept $\frac{2}{3}$, $y-$intercept 3

Lecture Video

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Solution Video

3.5 Linear and Nonlinear Relations

Question 1: Identify each relation as linear or nonlinear. Explain how you know.

Lecture Video <

Solution Video

Question 2: The area of a Circle of radius r is $A = \pi r^2$. Identify this relation as linear or nonlinear. Explain.

Lecture Video <

Solution Video

Question 3: Identify each relation as linear or nonlinear.

x	y
-3	9
-2	4
-1	1
0	0

Lecture Video <

Solution Video

Question 4: Identify each relation as linear or nonlinear.

x	y
5	1
6	2
7	3
8	4

Lecture Video <

Solution Video

Question 5: Identify each relation as linear or nonlinear.

x	y
1	0.25
2	0.50
3	0.75
4	1.00

Lecture Video <

Solution Video

Question 6: Johnny ran these distances while training for a marathon.

$Time(min)$	$DistanceRun(\mathbf{km})$
0	0
10	2
20	4
30	6

a. Would you choose time or distance as the independent variable? Explain.

b. Identify the relation between distance and time as linear or nonlinear. Explain how you know.

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Solution Video

Question 7: Identify the relation as linear or nonlinear. Explain your reasoning.

- the relation between the number of circles in each figure and the figure number

S

Lecture Video <

Solution Video

Question 8: Identify the relation as linear or nonlinear. Explain your reasoning.

- the relation between the number of stars in each figure and the figure number

S

Lecture Video <

Solution Video

Question 9: The relation between kilometres driven, la, and the amount of gasoline, G, (in litres) in the tank of a hybrid car is $G = 80 - 0.2k$.

a) Identify this relation as linear or nonlinear. Explain how you know.

b) Use either a graph or a table to confirm your answer in part a).

Lecture Video

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Solution Video

Question 10: When a piece of paper is folded in half. one crease line and two sections of paper are created. The paper is then folded in half again and again. each time increasing the number of crease lines by 1. Identify the relation between the number of creases and the number of sections of paper as linear or nonlinear. Justify your answer

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Solution Video

Question 11: Each pattern represents a relation between the figure number and the number of red triangles needed to make it.

a) Which of these patterns are linear and which are nonlinear relations?

b) Explain how you know.

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Solution Video

Question 12: Calculate the first, second, and third differences for each relation. What is the connection between the degree of the equation and the differences?

$y = x^3$

Lecture Video

Solution Video

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Question 13: The amount of cucumbers you can grow in a season depends on the amount of rainfall you get. This relation is represented by the equation $C = 0.006(R + 20)$, where R is the rainfall in millimetres and C is the cucumber yield in kilograms per square metre.

a) Identify this relation as linear or nonlinear. Explain how you know.

b) Use either a graph or a table of values to confirm your answer in part a).

Lecture Video

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Solution Video

Linear Relations Chapter Review

Question 1: Write the equation of a line for the table below.

x	y
1	0
3	2
5	4

Lecture Video <

Solution Video

Question 2: Write the equation of a line for the table below.

x	y
-1	1
2	-2
5	-5

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Question 3: Graph the line below.

$y = 2x + 4$

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Question 4: Write the equation of a line.

Lecture Video <

Solution Video

Question 5: Write the equation of a line.

Lecture Video <

Solution Video

Question 6: Sketch the graph of $3x - 2y = 12$

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a)

x	y
1	0
3	2
5	4

Question 7: Identify each relation in question 1 as a direct or partial variation. Explain.

b)

x	y
−1	1
2	−2
5	−5

c) $y = 2x + 4$

d)

e)

f) $3x - 2y = 12$

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a)

x	y
1	0
3	2
5	4

b)

x	y
−1	1
2	−2
5	−5

c) $y = 2x + 4$

d)

Question 8: Solve each relation below for $x = 7$.

e)

f) $3x - 2y = 12$

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Question 9: Calculate the slope of each line.

The rise is 4 and the run is 5.

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Solution Video

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Question 10: Calculate the slope of each line.

$\Delta y = 8$ when $\Delta x = 2$

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Solution Video

Question 11: Calculate the slope of each line.

The change in x is 6 and the change in y is 10.

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Question 12: Calculate the slope of each line.

The line passes through points (2, 7) and (6, -1)

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Question 13: Calculate the slope of each line.

The first differences are -5 when the change in x is 1.

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Question 14: Kristina is snowboarding down this hill.

a) On which segment will she go fastest? Why?

b) On which segment will she go slowest? Why?

c) Prove your answers to parts a) and b) mathematically.

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Question 15: Determine tow more ordered pairs that lie on each line.

The rise is 3, the run is 4, and (2, -5) is on the line.

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Solution Video

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Question 16: Determine tow more ordered pairs that lie on each line.

The slope is $\frac{2}{3}$ and the y-intercept is (0, 5).

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Solution Video

Question 17: Determine tow more ordered pairs that lie on each line.

The slope is $-\frac{3}{5}$ and the x-intercept is (3, 0).

Lecture Video <

Solution Video

Question 18: Determine tow more ordered pairs that lie on each line.

$\delta y = 5$, $\delta x = 2$, and (-1, -1) is on the line.

Lecture Video <

Solution Video

Question 19: Graph $y = \frac{2}{3}x - 4$

Lecture Video <

Solution Video

Question 20: Graph $3x - 6y = 12$

Lecture Video <

Solution Video

Question 21: A rectangle has a perimeter of 210 cm.

a) Explain why 2L + 2W = 210 models the case. What are L and W?

b) Graph 2L + 2W = 210.

c) Is the set of data discrete or continuous? Explain.

d) Determine two combinations of length and width for this rectangle.

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Question 22: Is $x = 5$ the x-intercept of $2x - 3y = 10$? Explain how you know.

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Question 23: Identify each relation as linear or nonlinear. Explain your reasoning.

a)

b) $y = 0.25x - 3$

c)

x	−3	−2	−1
y	2	3	4

d)

e) $y^2 = 4 - x^2$

f)

x	−3	−2	−1
y	27	8	1

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Question 24: A ball is hit straight up into the air. The table shows its height at various times.

$Time(s)$	$Height(m)$
0	1
1	26
2	41
3	46
4	41
5	26
6	1

a) Identify the relation between height and time as linear or nonlinear.

b) Graph the data.

c) Estimate the height of the ball at 1.5 seconds.

d) Estimate the time at which the height of the ball is 44 m.

e) Determine the time at which the ball hits the ground.

f) Determine the maximum height of the ball.

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Question 25: The table shows the value)1, in dollars, of a rate coin that is x years old.

x	y
0	0.25
10	750.25
20	1500.25
30	2250.25

a) Is this relationship linear or nonlinear?

b) Graph the data.

c) Find the equation of this relationship.

d) Use the equation to find the value of the coin after 15 years.

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Chapter Test Solutions

Question 1: A fruit stand sells apples for $0.25 each.

a. Describe the relation between cost and number of apples bought using a graph, a table, or an equation.

b. Which variable is independent and which is dependent?

c. Is the set of data continuous or discrete?

d. Determine the cost of 150 apples.

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Question 2: Gill rents a car for $45/day plus $0.15/km. Is the relation between distance and cost linear? Use a table to support your answer.

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Question 3: Is the following describe a

$Distance(m)$	0	4	8	12	16	20	24
$Time(s)$	0	1	2	3	4	5	6

- linear or non linear?
- direct or partial variation?

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Question 4: What is the slope of the line between points $(0, 4)$ and $(3, -1)$?

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Question 5: What is the rate of change of the stretch of a spring with a weight attached?

$Mass(g)$	1	2	3	4
$Stretch(cm)$	5	10	15	20

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Question 6: George is going 6km on foot. He can run at 4km/h and walk at 2km/h.

a. Explain why $4x + 2y = 6$ models the distance he will travel. What do x and y represent?

b. How long would it take him to run all the way and to walk all the way?

c. Graph the combinations of times that he could walk and run.

d. Determine three combinations of times that George could walk and run.

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Question 7: Identify the relation between the figure number and the number of squares as linear or nonlinear.

Use a table of values, a graph, and an equation to support your answer.

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Solution Video

Question 8: Identify the relation between the figure number and the number of squares as linear or nonlinear.

Use a table of values, a graph, and an equation to support your answer.

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Ch 1 to 3 Review - Rational, Polynomial, Lines

Question 1: Which expression do the tiles represent?

A. $(x^2 + 2x + 4) - (3x^2 - 3x + 1)$

B. $(x^2 + 2x + 4) - 3x^2 - 3x + 1$

C. $(-3x^2 + 3x + 1) + (x^2 + 2x + 4)$

D. $(-3x^2 - 3x - 1) + (x^2 + 2x + 4)$

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Question 2: The area and length of a rectangle are shown. Determine the missing side.

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Question 3: Read these statements about the graph.

i) Line 1 is a direct variation.

ii) Pay is the independent variable.

iii) Line 2 represents a lower-paying job than line 1.

Which choice best represents the statements?

A. Only i) is true.

B. Only ii) is true.

C. Both 1) and ii) are true.

D. Both i) and iii) are true.

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Chapter 4 Equations

4.1 Interpreting the Solution of Linear Equation

Question 1: Estimate the solution to $4.25x - 3 = 9.5$ using a table of values. Verify your solution.

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Question 2: Solve for x.

$2.75x + 3.8 = 3.8$

Lecture Video <

Solution Video

Question 3: Estimate the solution to $-2 = 5 - \frac{1}{4}x$ using a graph. Verify your solution.

Lecture Video <

Solution Video

Question 4: Solve for the unknown.

$$-2 + \frac{1}{2}n = -5$$

Lecture Video <

Solution Video

Question 5: Solve the following using algebra.

a) $4.25x - 3 = 9.5$

b) $-2 = 5 - \frac{1}{4}x$

Lecture Video <

Solution Video

Question 6: Solve for x.

$2x + 9 = 4$

Lecture Video <

Solution Video

Question 7: Solve for x.

$2x - 8 = -9$

Lecture Video <

Solution Video

Question 8: Solve for the unknown.

$2x + 3 = 11$

Lecture Video <

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Question 9: Justin is purchasing chain link fence for his yard. It costs $5.25 per linear foot of fencing. How many feet of fencing can he buy if his budget is $600?

a) Estimate the amount of fencing using a table of values or a graph.

b) Determine the exact amount of fencing using algebra.

c) Verify your solution.

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Question 10: A rectangular field is 100 m long. It is Fully enclosed by 500 m fencing.

a) Explain why the equation 500 = 2(100) + 2w can be used to determine w, the width of the field.

b) Estimate the solution to the equation. Verify your solution. Solve the equation using algebra.

c) Solve the equation using algebra.

d) How wide is the field?

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Question 11: Solve for x.

$-3x - 11 = 7$

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Solution Video

Question 12: Solve for x.

$35 - 2x = 13$

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Solution Video

Question 13: Solve for x.

$7 - 3x = 16$

Lecture Video <

Solution Video

Question 14: Solve for the unknown.

$-17 = 3 - 4n$

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Solution Video

Question 15: A rocket is launched from a hill that is 700 m high. The rocket's altitude increases by 35 m every 2 s.

a) Create the linear relation that models the rocket's upward path.

b) Graph the linear relation.

c) Write the equations you would solve to determine the height of the rocket at 50 s and 100 5. Estimate the solution to these equations using the graph.

d) Write the equation you would use to determine when the rocket reaches a height of 1000 m. Use the graph to estimate the solution to this equation.

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Question 16: Party Planners is catering a party. Its services cost $25 per person with a minimum of 50 guests, but it does not charge for the first 10 people.

a) Create the linear relation that models the catering costs in terms of the number of people attending the party.

b) Graph the linear relation.

c) Write the equations you would solve to determine the costs for 50 people and 75 people. Solve these equations using the graph.

d) Write the equations you would use to determine how many people could attend for a total cost of $1500. Estimate the solution using the graph.

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Question 17: A large water tank holds 100‘ L of water. It is leaking at a rate of 5 L/ min.

a) Write the linear relation that models the amount of water remaining in the tank in terms of the number of minutes since the tank started leaking.

b) Write the equation you would solve to determine the amount ofwater remaining in the tank 13 minutes after the water started leaking.

c) Write the equation you would solve to determine when the tank would be half full.

d) How are the equations in parts b), and c) similar? How are they different?

e) Solve each equation using a graph.

f) Solve each equation using algebra. Verify your solution using the equation.

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Question 18: This graph shows Samantha’s earnings against hours worked.

a) Write the linear relation that models this graph.

b) Write the equation you would solve to determine the number of hours worked if Samantha’s earnings were $500.

c) Write the equation you would solve to determine her earnings for 40 hours worked.

d) How are the equations in parts b) and c) similar? How are they different?

e) Estimate the solution to each of the equations using the graph. Verify your solutions.

f) Solve the equations using algebra.

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Question 19: Use algebra to determine the x-intercept for each of the following:

$y = 4x + 8$

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Solution Video

Question 20: Use algebra to determine the x-intercept for each of the following:

$y = \frac{1}{2}x - 5$

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Solution Video

Question 21: Use algebra to determine the x-intercept for each of the following:

$y = x$

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Solution Video

Question 22: Use algebra to determine the x-intercept for each of the following:

$y = -1$

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Question 23: a) Write an equation for the relationship between the figure num and number of counters in each figure.

b) Use the equation to determine the figure that can be made with exactly 60 counters

c) Explain why there is no figure in this pattern that can be made with exactly 100 counters.

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Question 24: Solve for x.

$$\frac{x+2}{5} - 3x = 7$$

Lecture Video <

Solution Video

Question 25: Solve for x.

$$\frac{1}{2}(x+2)-\frac{1}{3}(x-1)=4$$

Lecture Video <

Solution Video

Question 26: Solve for x.

$$x^2+7=16$$

Lecture Video <

Solution Video

Question 27: Solve for x.

$$2x^2-3=11$$

Lecture Video <

Solution Video

Question 28: Solve for x.

$3x^2 - 9 = 72$

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Solution Video

Question 29: Given the linear relation $y = mx + b$, what equation would you solve to determine the x—intercept? Justify your answer.

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4.2 Solving Linear Equations Using Inverse Operations

Question 1: List the inverse operations and the order in which you would apply them to isolate the variable in each equation.

$-3x + 2 = 15$

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Question 2: List the inverse operations and the order in which you would apply them to isolate the variable in each equation.

$12.4x - 3.2 = 21.5$

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Question 3: List the inverse operations and the order in which you would apply them to isolate the variable in each equation.

$\frac{x}{2} + 5 = 11$

Lecture Video <

Solution Video

Question 4: Solve each equation.

$$\frac{x}{4} + 1 = 3$$

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Solution Video

Question 5: Solve each equation.

$$\frac{x}{2} - 10 = 3$$

Lecture Video <

Solution Video

Question 6: Solve each equation.

$$5 - \frac{y}{3} = 3$$

Lecture Video <

Solution Video

Question 7: Solve each equation.

$$10 + \frac{b}{5} = -1$$

Lecture Video <

Solution Video

Question 8: Solve each equation.

$$\frac{w}{3} + 5 = 1$$

Lecture Video <

Solution Video

Question 9: Solve each equation.

$$3 - \frac{d}{6} = -1$$

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Solution Video

Question 10: Solve for the unknown.

$6b - 10 = -2$

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Solution Video

Question 11: Solve for the unknown.

$3f - 4 = 10$

Lecture Video <

Solution Video

Question 12: Solve for the unknown.

$2.5c + 1.0 = 1.5$

Lecture Video <

Solution Video

Question 13: Solve for the unknown.

$6 - 2d = 4$

Lecture Video <

Solution Video

Question 14: Solve for the unknown.

$6 - 2e = 6$

Lecture Video <

Solution Video

Question 15: Solve for the unknown.

$-3 - h = -2$

Lecture Video <

Solution Video

Question 16: The relation $C = 8.00 + 0.50T$ represents the cost of a pizza in dollars. T represents the number of toppings ordered.

(a) Write an equations that represents a $\$10$ order.

(b) Solve the equations in a) to determine the number of toppings. Show all steps.

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Question 17: A submarine is currently submerged at a depth of $600m$. It rises at a rate of $4m/s$.

(a) Write a linear relation that shows the relationship between the depth of the submarine and the number of second it has been rising.

(b) Write the equation you must solve to determine when the submarine will reach a depth of 486 m.

(c) List the inverse operations you need to use to isolate the variable and solve the equation.

(d) Solve the equation. Show all the steps.

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Question 18: A hot-air balloon is at a height of 500 m. I develops a steady leak and beings to descend at a rate of 60m/min. Write and solve an equation to determine how long it takes for the balloon to reach a height of 20 m

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Question 19: Liz was testing Jane on solving with equations. She gave Jane the following problem:

"I am a number such that when you divide me by 7, and then, add 13 you get 32. What number am I?"

Write and solve an equation to determine Liz's number.

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Question 20: Solve each equation.

$3(x+1)=12$

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Solution Video

Question 21: Solve each equation.

$2(x-4)=4$

Lecture Video <

Solution Video

Question 22: Solve each equation.

$2x + 3 = 4(1 - x) + 5$

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Solution Video

Question 23: Solve each equation.

$\frac{w+3}{4} = 2$

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Solution Video

Question 24: Solve each equation.

$\frac{y-5}{3} = 6$

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Solution Video

Question 25: Solve each equation.

$\frac{2a+3}{3} = 5$

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Solution Video

Question 26: Solve each equation.

$$-2 = \frac{-2c}{5} + 1$$

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Question 27: Jane's Restaurant charges $\$22.95$ for brunch but allows one person per table to eat free. To figure out how many people attended the Sunday brunch, Jack collected the information in this table.

$TableNumber$	$BillTotal(\$)$
1	137.70
2	68.85
3	160.65
4	91.80
5	91.80

a) Why is it reasonable that Jack used the equation $22.95(x-1) = T$ to determine the number of people at each table? What do the variables x and T represent?

b) Create and solve the equation for each table number.

c) How many people in total sat at the five tables?

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Question 28: The relationship between Celsius and Fahrenheit is represented by $C = \frac{5}{9}(F - 32)$

- Determine the Celsius temperature that is equivalent to $58^o F$.

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Question 29: The relationship between Celsius and Fahrenheit is represented by $C = \frac{5}{9}(F - 32)$

- List the operations you used to calculate the Celsius temperature.

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Question 30: The relationship between Celsius and Fahrenheit is represented by $C = \frac{5}{9}(F - 32)$

- List the inverse operations you would use to isolate F.
- Determine the Fahrenheit temperature that is equivalent to $25^o C$.

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Question 31: Solve each equation.

$$\frac{1}{2}x - \frac{1}{4} = \frac{x}{3} + \frac{1}{6}$$

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4.3 Equation-Solving Strategies

Question 1: Use inverse operations to solve $2x + 4 = 4x - 2$.

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Question 2: To determine the dimensions of the rectangle with

- perimeter 44 cm and
- width 3 cm less than the length,

Florence drew a diagram:

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Question 3: The perimeter of a rectangle is 36 cm. The width is 5 cm less than the length. Determine the dimensions of the rectangle.

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Question 4: A square has sides of length $2k - 1$ units. An equilateral triangle has sides of length $k + 2$ units. The square and the triangle have the same perimeter. What it he value of k?

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Question 5: Given solved equation below, explain the mathematical reasoning for each step.

$$\begin{array}{ccc} 2x + 8 & = & 4x - 18 \\ 2x + 8 - 2x & = & 4x - 18 - 2x \\ 8 & = & 2x - 18 \\ 8 & = & 2x - 18 \\ 8 + 18 & = & 2x - 18 + 18 \\ 26 & = & 2x \\ \frac{26}{2} & = & x \end{array}$$

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Question 6: Solve each equation. Verify each solution.

$5x + 24 = 2x$

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Question 7: Solve each equation. Verify each solution.

$2k = 4k - 15$

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Solution Video

Question 8: Solve each equation. Verify each solution.

$-4x - 1 = -3x + 5$

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Solution Video

Question 9: Solve each equation. Verify each solution.

$2x - 3x + 6 = 7 - x + 2$

Lecture Video <

Solution Video

Question 10: Solve each equation. Verify each solution.

$3b - 4 - 5b = -3b - 2$

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Solution Video

Question 11: Solve each equation. Verify each solution.

$a + 2a + 3a - 6 = 7a - 6$

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Question 12: Given each solved equation below, explain the mathematical reasoning for each step.

$$\begin{array}{rcl} \frac{1}{2}x + \frac{2}{3} & = & 5 \\ 6 \times (\frac{1}{2}x + \frac{2}{3}) & = & 5 \times 6 \\ 3x + 4 & = & 30 \\ 3x + 4 - 4 & = & 30 - 4 \\ 3x & = & 26 \\ \frac{3x}{3} & = & \frac{26}{3} \\ x & = & 8\frac{2}{3} \end{array}$$

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Question 13: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$$\frac{x-5}{4}+1=\frac{1}{2}$$

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Solution Video

Question 14: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$$-16=\frac{x}{5}+\frac{x}{3}$$

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Solution Video

Question 15: Solve each equation.

$$\frac{x}{2}+\frac{x}{3}=10$$

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Solution Video

Question 16: Solve each equation.

$\frac{c}{3} - \frac{c}{4} = 3$

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Question 17: Explain why the equations in each group are equivalent equations.

$5x + 8 = 2(2x - 3), 5x + 8 = 4x - 6$, and $5x - 4x = -6 - 8$

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Solution Video

Question 18: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$$-\frac{2}{5}(x - 8) = 4$$

Lecture Video <

Solution Video

Question 19: Explain why the equations in each group are equivalent equations.

$\frac{x}{4} + 5 = \frac{1}{3}$, $\frac{3x}{12} + \frac{60}{12} = \frac{4}{12}$, and $3x + 60 = 4$

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Solution Video

Question 20: Explain why the equations in each group are equivalent equations.

$5x - 8 = 12$, $\frac{5x}{6} - \frac{4}{3} = 2$, and $\frac{5x}{6} - \frac{8}{6} = \frac{12}{6}$

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Solution Video

Question 21: Solve $n + (n + 1) + (n + 2) = 54$

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Solution Video

Question 22: Solve each equation. Verify each solution.

$3(x-5)=6$

Lecture Video <

Solution Video

Question 23: Solve each equation. Verify each solution.

$-5=5(3+2d)$

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Solution Video

Question 24: Solve each equation. Verify each solution.

$-3(5-6m)=39$

Lecture Video <

Solution Video

Question 25: Solve each equation. Verify each solution.

$2(x-2)=3x-14$

Lecture Video <

Solution Video

Question 26: Solve each equation. Verify each solution.

$3(c+5)=4(1-2c)$

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Solution Video

Question 27: Solve each equation. Verify each solution.

$4(x-2)=-3(3x+6)$

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Question 28: George is three times as old as Sam. Five years from now, the sum of their ages will be 46.

(a) Create an equation that represents the relationship between George's and Sam's ages five years from now.

(b) Use your equation to determine they current ages.

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Question 29: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$\frac{3x}{4} + \frac{2}{3} = 2$

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Solution Video

Question 30: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$$\frac{1}{2} - \frac{x}{3} = \frac{1}{3}$$

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Solution Video

Question 31: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$$\frac{2}{3} = 5 + x$$

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Solution Video

Question 32: Find

- Common Denominator of All Terms
- Equation with Denominators Eliminated

$$\frac{y+2}{3} = \frac{1}{5}(2y+3)$$

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Question 33: Solve each equation.

$$\frac{x}{3} = 2$$

Lecture Video <

Solution Video

Question 34: Solve each equation.

$\frac{d}{4} + 3 = 2$

Lecture Video <

Solution Video

Question 35: Solve each equation.

$\frac{3k}{5} - 6 = \frac{k}{3}$

Lecture Video <

Solution Video

Question 36: Solve each equation.

$\frac{2x+1}{3} = 5$

Lecture Video <

Solution Video

Question 37: The sum of one-half of a number, q and thee-fifths is two-thirds the number is q, Determine the number.

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Question 38: Create and solve an equation.

- It takes Eli 4 hours to paint a room. It takes Mia 3 hours to paint a room. How long would it take them to pain the room together?

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Question 39: Create and solve an equation.

- Amir can put together a puzzle in 30 minutes. Bob takes double the amount of time. How long will it take them to do it together?

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Question 40: Create and solve an equation.

- A jet left Toronto for Vancouver, travelling at a speed 600 km/h. At the same time, a jet left Vancouver for Toronto, travelling at a speed of 800 km/h. If the distance between Toronto and Vancouver is 3500 km, when will the jets pass each other?

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Question 41: Show that the equation $2x - 3 = 4 + 2x$ has no solution. Explain.

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Question 42: Show that the equation $\frac{10-6x}{2} = 5 - 3x$ has an infinite number of solutions. Why do you think this happens?

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Question 43: David has 16 dimes and quarters. Colin has twice as many dimes and $\frac{1}{3}$ as many quarters as David.

They both have the same amount of money. How many coins of dimes and quarters did David have?

	$No.of Quarters$	$No.of dimes$	$Value of Quarters$	$Value of Dimes$
$David$	q	$16-\mathrm{q}$	$25\mathrm{q}$	
$Colin$	$\frac{9}{3}$			

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Question 44: Determine the value of x in each diagram.

Lecture Video

Solution Video

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Question 45: Determine the value of x in each diagram.

Lecture Video

Solution Video

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Question 46: Determine the value of x in each diagram.

Lecture Video <

Solution Video

Question 47: Solve the equation

$3x^2 - 2 = 25$

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Solution Video

Question 48: Solve the equation

$2(x+1)^2 - 1 = 71$

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Solution Video

Question 49: Chris is organizing a candy hunt for the children in her neighbourhood. He spent $\$102$ to buy 500 large candies and 400 small candies. The ratio of the price of a large candy to the price of a small candy is $7:4$. Find the prices of one large and one small candy.

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Mid Chapter Review Algebra

Question 1: Use a graph to determine the solution to each equation.

a) $x + 2 = 7$

b) $4x - 4 = 8$

c) $-2x - 9 = -5$

d) $-7x - 14 = -14$

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Solution Video

Question 2: A submarine starts at sea level and descends 50 m every 5 min.

a) Make a table of values of the submarine's depth. Use intervals of5 min, up to 30 min.

b) Graph the submarine's depth at 30 min.

c) What patterns do you see in the table and the graph?

d) If the submarine started at a depth of 219 m, what relation would model the submarine's location in relation to time?

e) Create an equation to show how long it would take the submarine to reach a depth of 428 m.

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Solution Video

Question 3: Solve using inverse operations.

$2x - 5 = 7$

Lecture Video <

Solution Video

Question 4: Solve using inverse operations.

$3x + 4 = 10$

Lecture Video <

Solution Video

Question 5: Solve using inverse operations.

$-6 = 3 + 3x$

Lecture Video <

Solution Video

Question 6: Solve using inverse operations.

$-2.1k + 5.6 = 20.2$

Lecture Video <

Solution Video

Question 7: Solve using inverse operations.

$-8.75z + 12.5 = 12.5$

Lecture Video <

Solution Video

Question 8: Solve using inverse operations.

$-a + 5 = 0$

Lecture Video <

Solution Video

Question 9: Anna joins a book club. The first six books are free, but after that he pays $8.98 per book.

a) Write an expression for the cost of b books.

b) How much would he pay for eight books?

c) Anna receives his first shipment of books with a bill for $53.88. Create and solve an equation to determine how many books he ordered.

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Question 10: Solve for x.

$$-x + 6 = 2x - 12$$

Lecture Video <

Solution Video

Question 11: Solve for x.

$$\frac{2}{3}x - 2 = 4x + \frac{4}{3}$$

Lecture Video <

Solution Video

Question 12: Solve for x.

$$4(x - 8) = -2(x - 5)$$

Lecture Video <

Solution Video

Question 13: Solve for x.

$$\frac{1}{5}(x+1) = \frac{1}{3}(2x-3)$$

Lecture Video <

Solution Video

Question 14: Solve for x.

$$\frac{2}{3}x - \frac{1}{2} = -\frac{1}{2} + \frac{1}{4}x$$

Lecture Video <

Solution Video

Question 15: Solve for x.

$$\frac{4x-2}{5} + \frac{1}{2} = \frac{3x+7}{2} - 1$$

Lecture Video <

Solution Video

Question 16: Solve

$$\frac{k}{3} + 1 = 4$$

Lecture Video <

Solution Video

Question 17: For each equation, write an equivalent equation multiply both sides by a constant to eliminate fraction expression then solve.

$$\frac{x}{2} - 3 = 1\frac{1}{6}$$

Lecture Video <

Solution Video

Question 18: For each equation, write an equivalent equation multiply both sides by a constant to eliminate fraction expression then solve.

$$-1\frac{2}{3}g + \frac{7}{9} = 0$$

Lecture Video <

Solution Video

Question 19: For each equation, write an equivalent equation multiply both sides by a constant to eliminate fraction expression then solve.

$$\frac{2}{3}h + \frac{1}{4} = 3\frac{1}{2}$$

Lecture Video <

Solution Video

Question 20: Create and solve an equation to answer each problem below.

The perimeter of a rectangle is 210 m. The length is 7 m longer than the width.

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Solution Video

Question 21: Solve for x.

Lecture Video <

Solution Video

Question 22: Tom has 117 quarters and dimes worth a total of $\$15.75$. How many of each coin does he have?

Lecture Video

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Solution Video

4.4 Solving for a Variable in a Linear Relations

Question 1: Solve for the variable indicated.

$3x + y = 5$, solve for x.

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Solution Video

Question 2: Solve for the variable indicated.

$2x + 5y = -10$; solve for y.

Lecture Video <

Solution Video

Question 3: Solve for y in terms of x.

$2y = 8 - 4x$

Lecture Video <

Solution Video

Question 4: Solve for y in terms of x.

$$-2x - 3y = 12$$

Lecture Video <

Solution Video

Question 5: Solve for y in terms of x.

$$2.8x + 1.1y - 5.3 = 0$$

Lecture Video <

Solution Video

Question 6: Solve for y in terms of x.

$$\frac{7}{5}y + \frac{2}{3}x = \frac{11}{13}$$

Lecture Video <

Solution Video

Question 7: Solve for y in terms of x.

$$\frac{4}{5} = \frac{2}{3}x + 1\frac{1}{2}y$$

Lecture Video <

Solution Video

Question 8: Solve for y in terms of x.

$$3(y-2) + 2x = 8$$

Lecture Video <

Solution Video

Question 9: Start with the relation $2x - 5y = 20$

Solve for y in terms of x.

Lecture Video <

Solution Video

Question 10: Start with the relation $2x - 5y = 20$

Graph this relation using x as the independent variable.

Lecture Video <

Solution Video

Question 11: Start with the relation $2x - 5y = 20$

State the slope and the intercepts of the graph.

Lecture Video <

Solution Video

Question 12: Start with the relation $2x - 5y = 20$

Solve for x in terms of y.

Lecture Video <

Solution Video

Question 13: Start with the relation $2x - 5y = 20$

Graph the relation using y as the independent variable.

Lecture Video <

Solution Video

Question 14: Solve the relation or formula for the variable indicated:

$2a - 5b = 12$; solve for a

Lecture Video <

Solution Video

Question 15: Solve the relation or formula for the variable indicated:

$0.35m + 2.4n = 9$; solve for n

Lecture Video <

Solution Video

Question 16: Solve the relation or formula for the variable indicated:

$\frac{1}{2}p - \frac{2}{3}q = \frac{1}{4}$; solve for p

Lecture Video <

Solution Video

Question 17: In each set of equations, identify the equation that is not equivalent to the others.

$2a - b = 4$; $2a = b + 4$; $a = \frac{b}{2} + 2$; and $b = 2a + 4$

Lecture Video <

Solution Video

Question 18: In each set of equations, identify the equation that is not equivalent to the others.

$x + 2y = -6$; $y = \frac{x}{2} + 3$; $x = 2y - 6$; and $x - 2y + 6 = 0$

Lecture Video <

Solution Video

Question 19: In each set of equations, identify the equation that is not equivalent to the others.

$4m - 3n + 2 = 4$; $3n = 4m + 2$; $4m = 3n - 2$; and $3n - 4m = 2$

Lecture Video

Solution Video

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Question 20: A cell-phone company offers a plan of $\$25$ per month and $\$0.10$ per minute of talk. The cost, C, in dollars, is given by the relation $C = 25 + 0.10n$, where n is the number of minutes used per month. Each month the company uses the exact air time to calculate ethane monthly bill.

Solve the relation for n in terms of C.

Lecture Video

Solution Video

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Question 21: A cell-phone company offers a plan of $\$25$ per month and $\$0.10$ per minute of talk. The cost, C, in dollars, is given by the relation $C = 25 + 0.10n$, where n is the number of minutes used per month. Each month the company uses the exact air time to calculate ethane monthly bill.

Create a table of values for this new relation.

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Question 22: A cell-phone company offers a plan of $\$25$ per month and $\$0.10$ per minute of talk. The cost, C , in dollars, is given by the relation $C = 25 + 0.10n$, where n is the number of minutes used per month. Each month the company uses the exact air time to calculate ethane monthly bill.

Graph this relation.

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Solution Video

Question 23: Start with the relation $2x - 5y = 20$

State the slope and intercepts of the graph.

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Solution Video

Question 24: Start with the relation $2x - 5y = 20$

Compare the slope of the two graphs. Justify your comparison.

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Solution Video

Question 25: A cell-phone company offers a plan of $\$25$ per month and $\$0.10$ per minute of talk. The cost, C, in dollars, is given by the relation $C = 25 + 0.10n$, where n is the number of minutes used per month. Each month the company uses the exact air time to calculate ethane monthly bill.

- What is the independent variable? What is the dependent variable?
- Why might someone want to rearrange this relation and express it in terms of the cost?

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Solution Video

Question 26: Solve the relation or formula for the variable indicated:

$I = prt$; solve for r

Lecture Video <

Solution Video

Question 27: Solve the relation or formula for the variable indicated:

$C = 2\pi r$; solve for r.

Lecture Video <

Solution Video

Question 28: Determine the height of the triangle if the area is $55cm^2$ and the base is 4 cm using $A = \frac{1}{2}bh$.

Lecture Video <

Solution Video

Question 29: Solve the relation or formula for the variable indicated:

$P = 2L + 2W$; solve for L

Lecture Video <

Solution Video

Question 30: Ben has $\$42.50$ in quarters and dimes.

Write a linear relation expressing the total amount of money in terms of the number of quarters and dimes.

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Solution Video

Question 31: Ben has $\$42.50$ in quarters and dimes.

$25q + 10d = 4250$ relates number of quarters to dimes when q is number of quarters and d is number of dimes.

Write an equation to express the number of quarters in terms of the number of dimes.

Lecture Video <

Solution Video

Question 32: Ben has $\$42.50$ in quarters and dimes.

$25q + 10d = 4250$ relates number of quarters to dimes when q is number of quarters and d is number of dimes.

Write an equation to express the number of dimes in terms of the number of quarters.

Lecture Video <

Solution Video

Question 33: Ben has $\$42.50$ in quarters and dimes.

$25q + 10d = 4250$ relates number of quarters to dimes when q is number of quarters and d is number of dimes.

Use one of your equation to determine the possible combinations of quarters and dimes Ben could have.

Lecture Video <

Solution Video

Question 34: A candy store is making a mixture of chocolate-coated almonds and n chocolate—coated raisins. The almonds cost \$30/kg and the raisins cost \$8/kg. The total cost of the mixture is to be \$150.

a. Write a linear relation expressing the total cost in terms of the mass of almonds and the mass of raisins purchased.

b. Write an equation to express the mass of almonds in terms of the mass of raisins.

c. Write an equation to express the mass of raisins in terms of the mass of almonds.

d. Which combinations of almonds and raisins will cost exactly \$150?

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Solution Video

Question 35: When you multiply a number, x, by k, add n, and then divide by r, the answer is w.

- Write the relation that models this situation.

Lecture Video <

Solution Video

Question 36: When you multiply a number, x, by k, add n, and then divide by r, the answer is w.

The equivalent equation is

$$\frac{xk+n}{r} = w$$

Solve the relation for x.

Lecture Video <

Solution Video

Question 37: When you multiply a number, x, by k, add n, and then divide by r, the answer is w.

The equivalent equation is

$$\frac{xk+n}{r}=w$$

Which of the following is rearrangement of equation above?

How is rearranging a relation or formula for a particular variable similar to isolating a variable in a linear equation? How is it different?

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Solution Video

Question 38: When you multiply a number, x, by k, add n, and then divide by r, the answer is w.

$$\frac{xk+n}{r}=w$$

- List the inverse operations that you would use, in the correct order, to isolate x.

Lecture Video <

Solution Video

Question 39: Solve for x.

$$\frac{5}{x}+2y=9$$

Lecture Video <

Solution Video

Question 40: Solve for x.

$$3x^2 + 50 = 197$$

Lecture Video

Solution Video

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Question 41: Solve for x.

$$(x-4)^2 - 12 = 24$$

Lecture Video

Solution Video

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Question 42: Solve for x.

$$\frac{3+y}{x} = -4$$

Lecture Video

Solution Video

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Question 43: Solve for x.

$\sqrt{x+1} = 9$

Lecture Video <

Solution Video

Question 44: Solve for x.

$2 - 8x^3 = 3$

Lecture Video <

Solution Video

Question 45: The formula for determining the surface area of a cylinder is $SA = 2\pi r^2 + 2\pi rh$.

Solve for h in terms of SA and r.

Lecture Video <

Solution Video

Question 46: The formula for determining the surface area of a cylinder is $SA = 2\pi r^2 + 2\pi rh$.

Determine the height of a cylinder with radius 5 cm and surface area 300 cm^2.

Lecture Video <

Solution Video

Question 47: The formula for determining the surface area of a cylinder is $SA = 2\pi r^2 + 2\pi rh$.

Solve for r in terms of the other variables.

Lecture Video <

Solution Video

4.5 Solving a Linear System Graphically

Question 1: Determine the point of intersection for system of linear equations shown below.

$y = \frac{1}{2}x + 1$ and $y = -x + 4$

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Solution Video

Question 2: Determine the point of intersection for system of linear equations shown below.

$y = x + 1$ and $y = 4x - 5$

Lecture Video <

Solution Video

Question 3: Determine the point of intersection for system of linear equations shown below.

$y = 2x - 1$ and $y = -x + 3$

Lecture Video <

Solution Video

Question 4: Determine the point of intersection for system of linear equations shown below.

$y = x$ and $y = -x$

Lecture Video <

Solution Video

Question 5: Does each pair of lines intersect at the given point?

$(2, 3)$: $y = x + 1$, $y = 4x - 5$

Lecture Video <

Solution Video

Question 6: Does each pair of lines intersect at the given point?

$(0, 2)$: $y = 3x + 2$, $y = 5x - 1$

Lecture Video <

Solution Video

Question 7: Does each pair of lines intersect at the given point?

$(-1, -3)$: $y = 4x + 1$, $y = x - 5$

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Solution Video

Question 8: Given the lines $y = 2$ and $y = 4x + 9$,

- Determine the point of intersection using a graph.

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Solution Video

Question 9: Given the lines $y = 2$ and $y = 4x + 9$,

- Create the linear equation that you would solve to determine the $x-$ value of the point of intersection.

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Solution Video

Question 10: To determine the point of intersection of $y = 2x + 5$ and $y = 4x - 3$, Elena wrote $2x + 5 = 4x - 3$ and solved the equation. Why is this a reasonable strategy for determining the point of intersection of the two lines?

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Solution Video

Question 11: Bill wants to earn extra money selling lemonade in front of his house. It costs $\$1.20$ to start his business and each glass of lemonade costs $\$0.06$ to make. He plans to sell the lemonade for $\$0.10$ a glass.

(a) Write an equation that represents his cost.

(b) Write an equation that represents his revenue.

(c) Graph both equations on the same set of axes.

(d) What does the point of intersection mean in this case?

(e) Does Bill make a profit or lose money for:

- *i)* 20 glasses sold?
- *ii)* 35 glasses sold?
- *iii)* 50 glasses sold?

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Solution Video

Question 12: Marie charges $\$3$ for every 4 bottles of water purchased from her store. She pays her supplier $\$0.25$ per bottle, plus $\$250$ for shelving and water delivery.

(a) Create a system of two linear equations to model this situation.

(b) How many bottles of water does she need to sell to break even?

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Question 13: Determine the point of intersection of each pair of lines.

$y = -3x - 2$ and $2x + 3y = 5$

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Solution Video

Question 14: Determine the point of intersection of each pair of lines.

$2x + 4y = 7$ and $-x + 0.75y = 5$

Lecture Video <

Solution Video

Question 15: Determine the point of intersection of each pair of lines.

$0.25x - 0.5y = 1$ and $3.25x + 4y = 22.5$

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Solution Video

Question 16: Determine the point of intersection of each pair of lines.

$y = 3x + 6$ and $1 = 3x - y$

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Solution Video

Question 17: Determine the point of intersection of each pair of lines:

$y - x = 9$ and $x - \frac{1}{6}y = -\frac{2}{3}$

Lecture Video <

Solution Video

Question 18: Determine the point of intersection of each pair of lines:

$2x - y = 0$ and $y = 5 + 2x$

Lecture Video <

Solution Video

Question 19: Determine the point of intersection of each pair of lines:

$5x + 8y - 12 = 0$ and $-5x + 16y - 12 = 0$

Lecture Video <

Solution Video

Question 20: Determine the point of intersection of each pair of lines:

$4x + y - 2 = 0$ and $8x + 2y - 4 = 0$

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Solution Video

Question 21: Determine the point of intersection of each pair of lines:

$\frac{1}{3}x - \frac{2}{5}y + \frac{1}{4} = 0$ and $2x - \frac{1}{7}y + \frac{1}{2} = 0$

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Solution Video

Question 22: Determine the point of intersection of each pair of lines:

$5x - 2.5y = 10$ and $3.1x + 4y = 6.2$

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Solution Video

Question 23: Given the relation $x + y = 5$, determine a second relation that:

- intersects $x + y = 5$ at (2, 3)
- $does\ not$ intersect $x + y = 5$

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Solution Video

Question 24: Given the relation $x + y = 5$, determine a second relation that:

- $does\ not$ intersect $x + y = 5$

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Solution Video

Question 25: The sum of two integers is 42. The difference of the two numbers is 17.

(a) Create a system of linear equations to model each statement above.

(b) Determine the integers using a graph.

Lecture Video

Solution Video

Question 26: Mike has $\$9.85$ in dimes and quarters. If there are 58 coins altogether, how many dimes and how many quarters does Mike have?

Lecture Video

Solution Video

Question 27: Does each pair of lines intersect at the given point?

$(1, -1)$: $y = 5x - 4$, $y = 2x - 3$

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Solution Video

Question 28: Determine the point of intersection of each pair of lines:

$y = 2$ and $y = 5$

Lecture Video <

Solution Video

Question 29: Determine the point of intersection of each pair of lines:

$y = -4$ and $x = 1$

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Solution Video

Question 30: Why does a system of two linear equations usually have only one solution for each of the two variables?

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Solution Video

Question 31: **(a)** Determine the point(s) of intersection of $y = 2x^2$ and $y = 8$ using a graph.

(b) Create and solve the equation that you would use to determine where the point of intersection lies.

(c) Are your solutions for parts (a) and (b) the same? Explain.

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Linear Algebra Chapter Review

Question 1: Write the linear system that corresponds to each equation.

$4x - 5 = 3$

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Solution Video

Question 2: Write the linear system that corresponds to each equation.

$\frac{1}{2}x + 3 = 5$

Lecture Video <

Solution Video

Question 3: Solve each of the following systems of equations using a graph.

- $3x - 4y = -12$ and $2x - 3y = 64$

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Solution Video

Question 4: Write the linear system that corresponds to each equation.

$-2(x-3)=-4$

Lecture Video <

Solution Video

Question 5: Write the linear system that corresponds to each equation.

$\frac{1}{4}(x+\frac{2}{5})=0$

Lecture Video <

Solution Video

Question 6: Solve each equation using algebra.

$3x+6=12$

Lecture Video <

Solution Video

Question 7: Solve each equation using algebra.

$4x - 8 = 12$

Lecture Video <

Solution Video

Question 8: Solve each equation using algebra.

$5 - 2x = 11$

Lecture Video <

Solution Video

Question 9: Solve each equation using algebra.

$-6x + 8 = -10$

Lecture Video <

Solution Video

Question 10: Determine the x-intercept of each of the following.

$y = -5x + 20$

Lecture Video <

Solution Video

Question 11: Determine the x-intercept of each of the following.

$2x + y = 10$

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Solution Video

Question 12: A promoter is holding a video dance. Tickets cost $\$15$ per person, and he has given away 10 free tickets to radio stations.

- Create the linear relation that models the money the promoter will earn in ticket sales in terms of the number of people attending the dance.

Lecture Video <

Solution Video

Question 13: A promoter is holding a video dance. Tickets cost $\$15$ per person, and he has given away 10 free tickets to radio stations.

Here is the linear equation that represents the above. $R = 15n - 150$

- Graph the linear relation.

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Solution Video

Question 14: For formula $C = \frac{5}{9}(F - 32)$ is used to convert Fahrenheit temperatures to Celsius.

Determine the Celsius temperature when $F = 90$

Lecture Video <

Solution Video

Question 15: For formula $C = \frac{5}{9}(F - 32)$ is used to convert Fahrenheit temperatures to Celsius.

Determine the Fahrenheit temperature when $C = 25$.

Lecture Video <

Solution Video

Question 16: A promoter is holding a video dance. Tickets cost $\$15$ per person, and he has given away 10 free tickets to radio stations.

Here is the linear equation that represents the above. $R = 15n - 150$ and below is the graph

- Write the equation you would use to determine how many people attended if ticket sales were only \$600. Estimate the solution using the graph.

Lecture Video <

Solution Video

Question 17: A promoter is holding a video dance. Tickets cost $\$15$ per person, and he has given away 10 free tickets to radio stations.

Find how many people bought the ticket if he made $\$600$?

You may use the equation below.

$R = 15n - 150$

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Solution Video

Question 18: Erin joins a CD club. The first 10 CDs are free, but after that she pays $\$15.95$ for each CD she orders.

- How much would she pay for 15 CDs?

Lecture Video

Solution Video

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Question 19: Erin joins a CD club. The first 10 CDs are free, but after that she pays $\$15.95$ for each CD she orders.

It can be modelled by $Cost = 15.95x - 159.5$

- Erin receives her first order of CDs with a bill for $\$31.90$. Create and solve an equation to determine how many she ordered.

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Solution Video

Question 20: Erin joins a CD club. The first 10 CDs are free, but after that she pays $\$15.95$ for each CD she orders.

- Write an expression for the cost of x CDs.

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Solution Video

Question 21: Solve the equation.

$9x + 2 = 11x - 10$

Lecture Video <

Solution Video

Question 22: Solve the equation.

$-\frac{4}{5}x + \frac{2}{3} = 1\frac{3}{4}x + 2$

Lecture Video <

Solution Video

Question 23: Solve the equation.

$$\frac{(4+x)}{3} + 4 = \frac{x-6}{2} - 6$$

Lecture Video <

Solution Video

Question 24: Solve the equation.

$-3(x+1) - 2 = 4x - 5(x-3)$

Lecture Video <

Solution Video

Question 25: Is $x = 3$ the solution to $5(3x - 2) = 4 - 10(x + 1)$? Explain how you know.

Lecture Video <

Solution Video

Question 26: Determine the length of each base for the trapezoids below if they have the same area.

Lecture Video <

Solution Video

Question 27: Solve each equation for the variable indicated.

$P = 2l + 2w; l$

Lecture Video <

Solution Video

Question 28: Solve each equation for the variable indicated.

$A = P + Prt; t$

Lecture Video <

Solution Video

Question 29: Solve each equation for the variable indicated.

$V = \pi r^2 h; h$

Lecture Video <

Solution Video

Question 30: Solve each equation for the variable indicated.

$Ax + By = C; y$

Lecture Video <

Solution Video

Question 31: For formula $C = \frac{5}{9}(F - 32)$ is used to convert Fahrenheit temperatures to Celsius.

Solve for F in terms of C.

Lecture Video <

Solution Video

Question 32: Solve for y in terms of x.

$8x - 4y = 12$

Lecture Video <

Solution Video

Question 33: Solve for y in terms of x.

$5x = 10y - 20$

Lecture Video <

Solution Video

Question 34: Solve for y in terms of x.

$3x - 3y - 9 = 0$

Lecture Video <

Solution Video

Question 35: Solve for y in terms of x.

$\frac{x}{4} + \frac{y}{2} = 2$

Lecture Video <

Solution Video

Question 36: Jose has $\$32.00$ in loonies and toonies.

- Write a linear relation expressing the total amount of money in terms of the number of loonies and toonies..

Lecture Video <

Solution Video

Question 37: Jose has $\$32.00$ in loonies and toonies.

- Write an equation to express the number of toonies in terms of the number of loonies.

Lecture Video

Solution Video

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Question 38: Jose has $\$32.00$ in loonies and toonies.

- Use your equation to determine which one of the following is a possible combination of coins Josh could have.

Lecture Video

Solution Video

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Question 39: Jose has $\$32.00$ in loonies and toonies.

- Is it possible that Jose has 13 toonies and 5 loonies? Explain.

Lecture Video

Solution Video

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Question 40: Solve the equation $4 = -2x - 3$ byl graphing $y = -2x - 3$ and $y = 4$. The x-value where the two lines intersect is the solutions.

a) What is the solution to this equation based on the graph?

b) Verify the solution using algebra.

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Solution Video

Question 41: Solve the equation $4 = -2x - 3$ byl graphing $y = -2x - 3$ and $y = 4$. The x-value where the two lines intersect is the solutions.

How could you use this strategy to solve $3x - 4 = 2x + 3$?

Lecture Video <

Solution Video

Question 42: Fitness centre A has a monthly membership fee of $\$90$. Members pay $5 to take an aerobics class. At Fitness centre B, there is no membership fee, but clients pay $\$10$ per class.

a) Write a linear relation for the yearly cost in terms of the number of aerobics classes.

b) Graph the equations on the same set of axes.

c) State the point of intersection.

d) What does the point of intersection mean in this case?

e) How would you advise someone who is trying to choose between the two fitness clubs?

Lecture Video

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Solution Video

Question 43: The Video Stream you can watch movies for $\$3.00/month$ each and has no membership fee. At Rent Stream you can view movies for $\$2/month$ but has a $\$15$ membership fee.

a) Write an equation for each situation.

b) Graph both equations on the same set of axes. Find the point of intersection.

c) What does the point of intersection mean in this case?

d) What advice would you give to someone who is deciding which video store to use?

Lecture Video

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Solution Video

Practice Test

Question 1: a) Explain how each of the following illustrates a valid approach to solving the equation $3.50x + 2.70 = 6.55$

b) Which method leads to an exact solution?

Table of Values	Graph	Solve an Equation
x | $3.50x + 2.70$ 0.0 | 2.70 0.2 | 3.40 0.4 | 4.10 0.6 | 4.80 0.8 | 5.50 1.0 | 6.20 1.2 | 6.90 1.4 | 7.60 1.6 | 8.30 1.8 | 9.00 2.0 | 9.70 The solution is between 1.0 and 1.2.	$y = 3.50x + 2.70$ The solution is $x \doteq 1.1$.	$3.50x + 2.70 = 6.55$ $3.50x + 2.70 - 2.70 = 6.55 - 2.70$ $3.5x = 3.85$ $3.5x \div 3.5 = 3.85x \div 3.5$ $x = 1.1$ The solution is $x = 1.1$.

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Solution Video

Question 2: Solve and verify each equation.

$-2a + 5 = 3$

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Solution Video

Question 3: Solve and verify each equation.

$4 - 2x = 8$

Lecture Video

Solution Video

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Question 4: Solve and verify each equation.

$$\frac{5}{6}x - \frac{3}{4} = \frac{1}{4}$$

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Solution Video

Question 5: Solve and verify each equation.

$$3(x-1) + 2(3x+1) = 2$$

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Solution Video

Question 6: Rearrange each equation to solve for the variable indicated.

$-3x + 2y = 6$; solve for y

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Solution Video

Question 7: Rearrange each equation to solve for the variable indicated.

$y = 3x + 2$; solve for x.

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Solution Video

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Question 8: David has two part-time jobs. He earns $\$14/\mathrm{h}$ at one and $\$11/\mathrm{h}$ at the other. David wants to know how many hours it will take him to earn $\$1000$

a) Find two combinations of the numbers of hours David could work at each job to earn $\$1000$.

b) Graph the relation.

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Question 9: Justin charges $\$21$ per linear foot to install a wood fence. It costs him $\$19$ per linear foot plus $\$4000$ to purchase materials and hire installers each month. How many linear feet of fencing would he need to install each month to break even?

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Question 10: Determine the point of intersection for each system of linear equations.

$y = 7x - 9$ and $y = -x - 1$

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Solution Video

Question 11: Determine the point of intersection for each system of linear equations.

$-x - 2y = -3$ and $3x + y = -2$

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Solution Video

Chapter 5 Lines in Coordinate System

5.1 Exploring the Equation of a Line

Question 1: Match each linear equation with the graph that best represents it.

$$\begin{array}{llllll} a) & y=-3x+5 & c) & y=\frac{5}{8}x & e) & x=5 \\ b) & y=7x-4 & d) & y=-\frac{1}{4}x-4 & f) & y=3 \end{array}$$

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Question 2: Consider the lines formed by each of the following equations.

$$\begin{array}{llll} a) & y=-2x+8 & b) & y=\frac{1}{3}x+1 \\ & y=-\frac{15}{2}x+3 & & y=3x-9 \\ & y=-\frac{1}{2}x-7 & & y=x+5 \end{array}$$

- i) Identify the steepest and the least steep line in each of parts a) and b).
- ii) Use the slope and y-intercept to sketch the graphs to verify your answers in i).

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Question 3: **a)** What linear equation represents the x-axis?

b) What linear equation represents the y-axis?

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Solution Video

5.2 Different Forms of the Equation of a Line

Question 1: Express the equation $5x + 6y + 15 = 0$ in the form $y = mx + b$.

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Question 2: Express each of the following equations in the form $y = mx + b$. Then, state the slope and y-intercept of each line.

$8x + 5y = 0$

Lecture Video <

Solution Video

Question 3: The dependent variable is d in each of the following equations. Isolate d to determine the d—intercept and the slope of each line.

$4t + 3d = 9$

Lecture Video <

Solution Video

Question 4: The dependent variable is d in each of the following equations. Isolate d to determine the d-intercept and the slope of each line.

$8d - 2h + 16 = 0$

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Solution Video

Question 5: Show that $3x - 8y + 5 = 0$ and $y = \frac{3}{8}x + \frac{5}{8}$ represents the same line.

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Solution Video

Question 6: a) Determine the slope and y-intercept for each linear equation.

- i) 3x + 4y - 8 = 0
- ii) 2x + 5y - 9 = 0
- iii) 4x - 3y = -12

b) An equation is given in the form $Ax + By + C = 0$.

- i) What is the slope of this line?
- ii) What is the y-intercept of this line?

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Question 7: A room contains three-legged stools and four-legged chairs. There are 48 legs altogether.

a) Write an equation to represent the relationship between the number of stools, the number of chairs, and the total number of legs.

b) How many stools could there be?

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Question 8: Amanda plans to make chocolate-chip cookies and oatmeal cookies for a bake sale. The chocolate-chip cookies use three eggs per batch. The oatmeal cookies use two eggs per batch. If Amanda makes 6 oatmeal cookies, how many chocolate-chip cookies did she make? Show your work.

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Question 9: Express each of the following equations in the form $y = mx + b$. Then, state the slope and y-intercept of each line.

$4x - 3y = 24$

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Solution Video

Question 10: Express each of the following equations in the form $y = mx + b$. Then, state the slope and y-intercept of each line.

$2x + 5y = 15$

Lecture Video <

Solution Video

Question 11: Express each of the following equations in the form $y = mx + b$. Then, state the slope and y-intercept of each line.

$3x - 6y - 14 = 0$

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Solution Video

Question 12: Express each of the following equations in the form $y = mx + b$. Then, state the slope and y-intercept of each line.

$4x + 7y - 11 = 0$

Lecture Video <

Solution Video

Question 13: Express each of the following equations in the form $y = mx + b$. Then, state the slope and y-intercept of each line.

$2.4x + 1.5y = -3$

Lecture Video <

Solution Video

Question 14: Use the slope and y-intercept to sketch the graphs of each of the linear relations.

$4x - 3y = 24$

Lecture Video <

Solution Video

Question 15: Use the slope and y-intercept to sketch the graphs of each of the linear relations.

$2x + 5y = 15$

Lecture Video <

Solution Video

Question 16: Use the slope and y-intercept to sketch the graphs of each of the linear relations.

$3x - 6y - 14 = 0$

Lecture Video <

Solution Video

Question 17: Use the slope and y-intercept to sketch the graphs of each of the linear relations.

$4x + 7y - 11 = 0$

Lecture Video <

Solution Video

Question 18: Use the slope and y-intercept to sketch the graphs of each of the linear relations.

$2.4x + 1.5y = -3$

Lecture Video <

Solution Video

Question 19: Without graphing, predict whether each of the following lines will rise or fall to the right. How do you know?

- $2x + 3y = 5$

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Solution Video

Question 20: Without graphing, predict whether each of the following lines will rise or fall to the right. How do you know?

- $2x + 5y = 15$

Lecture Video <

Solution Video

Question 21: Without graphing, predict whether each of the following lines will rise or fall to the right. How do you know?

- $\frac{x}{2} - 3y = 6$

Lecture Video <

Solution Video

Question 22: State whether each of the following lines will rise or fall to the right by graphing it.

$2x + 3y = 5$

Lecture Video

Solution Video

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Question 23: State whether each of the following lines will rise or fall to the right by graphing it.

$x - 4y + 10 = 0$

Lecture Video

Solution Video

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Question 24: State whether each of the following lines will rise or fall to the right by graphing it.

$3x + 5y - 8 = 0$

Lecture Video

Solution Video

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Question 25: State whether each of the following lines will rise or fall to the right by graphing it.

$2.5x - 15y = 20$

Lecture Video <

Solution Video

Question 26: State whether each of the following lines will rise or fall to the right by graphing it.

$\frac{x}{2} - 3y = 6$

Lecture Video <

Solution Video

Question 27: The dependent variable is d in each of the following equations. Isolate d to determine the d-intercept and the slope of each line.

$15 + 5k - 6d = 0$

Lecture Video <

Solution Video

Question 28: Use the slope and y-intercept to sketch the graphs of each of the linear relations.

$8x + 5y = 0$

Lecture Video <

Solution Video

Question 29: Without graphing, predict whether each of the following lines will rise or fall to the right. How do you know?

- $x - 4y + 10 = 0$

Lecture Video <

Solution Video

Question 30: Without graphing, predict whether each of the following lines will rise or fall to the right. How do you know?

- $2.5x - 15y = 20$

Lecture Video <

Solution Video

Question 31: Show that $y = \frac{2}{3}x + \frac{7}{3}$ and $x = \frac{3}{2}y - \frac{7}{2}$ represent the same line.

Lecture Video

Solution Video

Question 32: A farmer wants to build new enclosures for geese, ducks, and chickens. He has $40\ \mathrm{m}$ of fencing to build the three identical, adjacent enclosures.

a) Write an equation to represent the amount of fencing required.

b) Rearrange your equation to isolate one of the variables.

c) Graph the relationship.

d) Suggest three possible sets of dimensions for the farmer's enclosures.

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Question 33: Evan spend a total of $18 on gourmet jellybeans and chocolate-covered almonds. The jellybeans cost $12/kg. The almonds cost $21/kg.

(a) Write an equation to represent Evan's purchases.

(b) Isolate the variable for the quantity of jellybeans in your equation.

(c) If Evan bought 250 g of almonds, how many grams of jellybeans did he buy?

(d) If Evan bought 100g of almonds, how many grams of jellybeans did he buy?

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Question 34: Brenda has a total of 41 loonies and toonies in her piggy bank. Their total value is $\$59$.

(a) Write one equation for the total number of coins and a second equation for the total value.

(b) Graph both lines.

(c) Determine the coordinates of the point of intersection of the lines.

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Question 35: Do $y = \frac{2}{3}x + \frac{1}{3}$ and $2x + 3y + 1 = 0$ represent the same line? How do you know?

Lecture Video <

Solution Video

5.3 Slope of a Line

Question 1: Calculate the slope of the line through each pair of points.

$A(3, 8)$ and $B(10, 15)$

Lecture Video <

Solution Video

Question 2: Calculate the slope of the line through the pair of points.

$I(3.5, 4.8)$ and $J(1.4, 6.2)$

Lecture Video <

Solution Video

Question 3: Calculate the slope of the line through the pair of points.

$K(32, 630)$ and $L(58, 1020)$

Lecture Video <

Solution Video

Question 4: Calculate the slope of the line through each pair of points.

$C(9, -2)$ and $D(8, 4)$

Lecture Video <

Solution Video

Question 5: Calculate the slope of the line through the pair of points.

$A(-2, 5)$ and $B(4, -8)$

Lecture Video <

Solution Video

Question 6: Calculate the slope of the line through the pair of points.

$C(0, 5)$ and $D(-2, 3)$

Lecture Video <

Solution Video

Question 7: Calculate the slope of the line through the pair of points.

$E(5, 10)$ and $F(5, -4)$

Lecture Video <

Solution Video

Question 8: Calculate the slope of the line through the pair of points.

$G(-7, 8)$ and $H(4, 8)$

Lecture Video <

Solution Video

Question 9: (a) Plot the points $(-3, 8)$ and $(5, 8)$ and draw the line that passes through them.

(b) Calculate the slope of the line using the slope formula.

(c) What can you conclude about the slope of a horizontal line?

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Question 10: (a) Plot the points $(4, 10)$ and $(4, -1)$ and draw the line that passes through them.

(b) Calculate the slope of the line using the slope formula.

(c) What can you conclude about the slope of a vertical line?

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Question 11: The point $(-2, -3)$ lies on a line with slope $\frac{2}{3}$. Determine the y-coordinate of the point on the line with x-coordinate 13.

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Solution Video

Question 12: Write the coordinates of one other point that would be on the line passing through the point A $(2, 5)$ with each of the slope value of

$-\frac{1}{4}$

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Solution Video

Question 13: Write the coordinates of one other point that would be on the line passing through the point A $(2, 5)$ with each of the slope value of

$\frac{8}{3}$

Lecture Video

Solution Video

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Question 14: Write the coordinates of one other point that would be on the line passing through the point A $(2, 5)$ with each of the slope value of

-4

Lecture Video

Solution Video

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Question 15: Write the coordinates of one other point that would be on the line passing through the point A $(2, 5)$ with each of the slope value of

0

Lecture Video

Solution Video

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Question 16: For the points J, K, and L, the slope of segment $\overline{\mathrm{JK}}$ is -4 and the slope of segment $\overline{\mathrm{KL}}$ is -2. Explain how you know that J, K, and L are not collinear.

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Question 17: Determine whether the given points are collinear.

$A(-8,0)$, $B(-6,1)$ and $C(4,6)$

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Solution Video

Question 18: Determine whether the given points are collinear.

$D(-5,17)$, $E(-12,40)$, and $F(-42,128)$

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Solution Video

Question 19: Determine whether the given points are collinear.

$G(-30,-70)$, $H(-15,-38)$, and $I(17,26)$

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Solution Video

Question 20: Determine whether the given points are collinear.

$J(-9,1)$, $K(-12,3)$, and $L(6,-9)$

Lecture Video <

Solution Video

Question 21: Determine the value of k if the points $X(3,2)$, $Y(k,8)$, and $Z(k+7,29)$ are collinear.

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Solution Video

Question 22: Consider the points A $(7, k)$, B $(11, 4)$, and C $(13, 1 - 3k)$.

If A, B, and C are collinear, determine the value of k.

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Question 23: Consider the points A $(7, k)$, B $(11, 4)$, and C $(13, 1 - 3k)$.

- If A, B, and C are collinear, determine the coordinates of A and C.
- Determine a possible value of k for which the points would not be collinear.

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Question 24: a) What is the slope of a line that is horizontal.

b) What is the slope of a line that is vertical.

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Solution Video

Question 25: How can you tell from the coordinate of two points if the line passing through them is horizontal, vertical, or slanted?

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Solution Video

Question 26: Nancy was cycling toward his home. After 2 h of cycling he was 55 km from home, and after 4.5 h of cycling he was 17.5 km from home. Assuming he was cycling at a constant rate, how fast was she cycling?

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Solution Video

Question 27: A house worth $\$150000$ in 1999 increased by a constant rate to its value of $\$255000$ in 2007. Calculate the home's annual rate of increase in value.

Lecture Video <

Solution Video

Question 28: If you hire Damian Delicious Dinners to cater a party, it will cost $\$450$ for 20 guests and $\$675$ for 35 guests. If the company charged a fixed rate per guest, calculate the cost per person.

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Question 29:

$HoursWorked$	20	25	30	40	50
$WeeklyEarnings(\$)$	390	450	510	630	750

a) Plot the following data so that x-axis hours worked and y-axis is Weekly earnings.

b) Find the slope and state the meaning of the slope.

c) How many hours do you need to work to make $900.

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Question 30:

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Question 31:

$Name$	$Vert.Drp(ft)$	$lenghofSope(ft)$
$snows$	256	890
$Bean$	480	4824
$Vortex$	510	3438

Which slope has the steepest slope?

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Question 32:

Which line has a sloe between 1.1 and 10?

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Solution Video

Question 33: For each situation write an equation of the line in the form $y = mx + b$.

- The slope is 5 and the y-intercept is 2.

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Solution Video

Question 34: For each situation write an equation of the line in the form $y = mx + b$.

- The slope is -4 and the point $(4, -3)$ is one the line.

Lecture Video <

Solution Video

Question 35: For each situation write an equation of the line in the form $y = mx + b$.

- The slope is $\frac{2}{3}$ and the point $(6, 4)$ is on the line.

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Solution Video

Question 36: For each situation write an equation of the line in the form $y = mx + b$.

- The line is vertical and passes through the point (2, 5).

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Question 37: For each situation write an equation of the line in the form $y = mx + b$.

- The line is horizontal and passes through (-1, -2).

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Mid Chapter Review on Lines

Question 1: Identify the slope and y-intercept of the line.

a. $y = 4x - 5$

b. $y = -2x + 3$

c. $y = \frac{3}{7}x - \frac{2}{3}$

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Question 2: Describe each line using words: *horizontal, vertical, rising to the right, or falling to the right*.

a. $y = -3x + 5$

b. $y = -2$

c. $y = \frac{2}{3}$

d. $x = 4.5$

e. $y = 4x - 1$

f. $y = \frac{3}{4}x + \frac{1}{3}$

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Question 3: Order each of the following sets of lines based on slope, from closest to horizontal to closest to vertical.

1. $y = \frac{2}{3}x - 7$
2. $y = 2.5x - 3.7$
3. $y = \frac{9}{2}x + 4$

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Solution Video

Question 4: Order each of the following sets of lines based on slope, from closest to horizontal to closest to vertical.

1. $y = -\dfrac{1}{5}x + 8$
2. $y = -6x - \frac{5}{8}$
3. $y = -2x + 4$

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Question 5: Suppose each equation set represents ski hill.

a) Which two equation could not possibly represent ski hills? Why?

b) Organize the hills to: *Bunny Hills(least steep), Intermediate Hills(moderately steep), and Double Black Diamond Hills(steepest)*.

Set 1

1. $y = x$
2. $y = 7$
3. $x = 2$

Set 2

1. $y = \frac{2}{3}x - 7$
2. $y = 2.5x - 3.7$
3. $y = \frac{9}{2}x + 4$

Set 3

1. $y = -\frac{1}{5}x + 8$
2. $y = -6x - \frac{5}{8}$
3. $y = -2x + 4$

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Question 6: Sketch the graph using slope and y-intercept.

$y = 2x - 4$

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Solution Video

Question 7: Sketch the graph using slope and y-intercept.

$y = -\frac{1}{4}x + 3$

Lecture Video <

Solution Video

Question 8: Order each of the following sets of lines based on slope, from closest to horizontal to closest to vertical.

1. $y = x$
2. $y = 7$
3. $x = 2$

Lecture Video <

Solution Video

Question 9: Sketch the graph using slope and y-intercept.

$y = -\frac{7}{6}x$

Lecture Video <

Solution Video

Question 10: Rewrite the following in the form $y = mx + b$.

$6x - 3y - 15 = 0$

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Solution Video

Question 11: Rewrite the following in the form $y = mx + b$.

$3x + 6y + 12 = 0$

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Solution Video

Question 12: Rewrite the following in the form $y = mx + b$.

$2x - 8y = 10$

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Solution Video

Question 13: Rewrite the following in the form $y = mx + b$.

$y - 10 = 0$

Lecture Video <

Solution Video

Question 14: Rewrite the following in the form $y = mx + b$.

$4x + y - 9 = 0$

Lecture Video <

Solution Video

Question 15: Rewrite the following in the form $y = mx + b$.

$2x - 3y = -1$

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Solution Video

Question 16: Movie tickets are $\$8$ each and concert tickets are $\$12$ each. Andrew spent a total of $\$100$ on movie and concert tickets.

a. Write an equation to represent the total cost for movie and concert tickets.

b. Rewrite the equation in the form $y = mx + b$

c. Determine which of the following is a possible combinations of movie and concert tickets that Andrew might have bought.

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Question 17: Determine the slope.

Lecture Video <

Solution Video

Question 18: Determine the slope.

Lecture Video <

Solution Video

Question 19: Determine the slope.

Lecture Video

Solution Video

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Question 20: Determine the slope.

Lecture Video

Solution Video

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Question 21: Determine the slope.

Lecture Video

Solution Video

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Question 22: Determine the slope.

Lecture Video <

Solution Video

Question 23: Calculate the slope of the line passing through the pair of points.

$A(3, 8)$ and $B(5, 7)$

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Solution Video

Question 24: Calculate the slope of the line passing through the pair of points.

$C(8, 9)$ and $D(-2, -2)$

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Solution Video

Question 25: Calculate the slope of the line passing through the pair of points.

$E(-8, 4)$ and $F(4, -8)$

Lecture Video <

Solution Video

Question 26: Calculate the slope of the line passing through the pair of points.

$I(0, 0)$ and $J(-3, -5)$

Lecture Video <

Solution Video

Question 27: Calculate the slope of the line passing through the pair of points.

$M(0, 4)$ and $N(-3, 4)$

Lecture Video <

Solution Video

Question 28: Calculate the slope of the line passing through the pair of points.

$P(-2,-1)$ and $Q(-2,-9)$

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Solution Video

Question 29: Determine if the points are collinear.

$A(-3,-2)$, $B(-2,1)$, and $C(2,10)$

Lecture Video <

Solution Video

Question 30: Determine if the points are collinear.

$D(7,-1), E(6,5)$, and $F(2,1)$

Lecture Video <

Solution Video

Question 31: Determine if the points are collinear.

$G(-7,-5), H(-2,10)$, and $I(-9,-11)$

Lecture Video <

Solution Video

Question 32: Determine if the points are collinear.

$J(8,9), K(-6,7)$, and $L(24,11)$

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Solution Video

Question 33: Point A has coordinates $A(3,k)$, and the slope AB is $\frac{2}{5}$. Determine the value of k for each point B.

$B(7,-2)$

Lecture Video <

Solution Video

Question 34: Point A has coordinates $A(3, k)$, and the slope of AB is $\frac{2}{5}$. Determine the value of k for each point B.

$B(13, 5)$

Lecture Video

Solution Video

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Question 35: Point A has coordinates $A(3, k)$, and the slope of AB is $\frac{2}{5}$. Determine the value of k for each point B.

$B(-2, 2)$

Lecture Video

Solution Video

<

Question 36: Point A has coordinates $A(3, k)$, and the slope of AB is $\frac{2}{5}$. Determine the value of k for each point B.

$B(9, 10)$

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Solution Video

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Question 37: A catering company charges $550 for 20 guests and $775 for 35 guests. What is the cost per person?

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Solution Video

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Question 38: At the end of July, the Robillard family headed home after a vacation. The Robillards were 750 km from home when they started out, but 4 h later they were only 394 km from home. They didn’t stop and they maintained a constant speed. How fast were they driving?

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Solution Video

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5.4 Using Points to Determine the Equation of a Line

Question 1: Find the equation from the given information

- Slope: 3
- y-intercept: 5
- Equation:

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Question 2: $m = -5$, y-intercept is 3, find the equation.

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Solution Video

Question 3: Determine the equation of the line described below.

passing through the point $A(0, 4)$, with a slope of $-\frac{8}{9}$

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Solution Video

Question 4: Find the missing values from the given information

- Slope:
- y-intercept:
- Equation: $y = 5x + 1$

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Question 5: find m and,y-int when equation of the line is $y = \frac{4}{3}x - 2$

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Solution Video

Question 6: find m and,y-int when equation of the line is $y = \frac{1}{2}x$

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Solution Video

Question 7: Match each equation to its corresponding graph.

$x = -2$

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Solution Video

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Question 8: Match each equation to its corresponding graph.

$y = -2$

Lecture Video

Solution Video

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Question 9: Match each equation to its corresponding graph.

$x - 2y = 4$

Lecture Video

Solution Video

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Question 10: Match each equation to its corresponding graph.

$y = -\frac{4}{3}x + 3$

Lecture Video

Solution Video

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Question 11: Determine the equation of the line with the following characteristics

has slope of -2 and passes through the point $A(5, 2)$

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Solution Video

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Question 12: Determine the equation of the line described below.

passing through the point $A(3, -5)$, with a slope of $\frac{1}{5}$

Lecture Video

Solution Video

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Question 13: Determine the equation of the line with the following characteristics

passes through the points $B(4,6)$ and $C(1,-3)$

Lecture Video

Solution Video

Question 14: Determine the equation of the line described below.

has an x-intercept of 6 and passes through the point $(6,4)$

Lecture Video

Solution Video

Question 15: Determine the equation of each line passing each pair of points.

$A(1,9), B(1,-7)$

Lecture Video

Solution Video

Question 16: Determine the equation of each line passing each pair of points.

$C(-8,-3), D(8,27)$

Lecture Video <

Solution Video

Question 17: Determine the equation of each line passing each pair of points.

$E(-12,7), F(4,7)$

Lecture Video <

Solution Video

Question 18: Determine the equation of each line passing each pair of points.

$G(6,18), H(-12,3)$

Lecture Video <

Solution Video

Question 19: Determine the equation of each line passing each pair of points.

$I(0,5)$ and $J(0,12)$

Lecture Video

Solution Video

Question 20: Determine the equation of each line passing each pair of points.

$K(-5,-1), L(15,1)$

Lecture Video

Solution Video

Question 21: Determine the equation of the line that has the same x-intercept as the line described by $x - 5y + 10 = 0$, and the same y-intercept as the line $3x + 2y - 6 = 0$.

Lecture Video

Solution Video

Question 22: $m = 0$, y-intercept is 2, find the equation.

Lecture Video <

Solution Video

Question 23: Determine the equation of each line.

Lecture Video <

Solution Video

Question 24: Determine the equation of each line.

Lecture Video

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Solution Video

Question 25: Determine the equation of each line.

Lecture Video <

Solution Video

Question 26: Determine the equation of each line.

Lecture Video <

Solution Video

Question 27: Determine the equation of each line.

Lecture Video <

Solution Video

Question 28: Determine the equation of each line.

Lecture Video <

Solution Video

Question 29: If the equation $y = 3x + b$ represents a line that passes through the given point, determine the value of the y-intercept b.

$(4, 1)$

Lecture Video <

Solution Video

Question 30: If the equation $y = 3x + b$ represents a line that passes through the given point, determine the value of the y-intercept b.

$(-3, 2)$

Lecture Video <

Solution Video

Question 31: If the equation $y = 3x + b$ represents a line that passes through the given point, determine the value of the y-intercept b.

$(1, -3)$

Lecture Video <

Solution Video

Question 32: If the equation $y = mx + 3$ represents a line that passes through the given point, determine the value of m.

$(2, 4)$

Lecture Video <

Solution Video

Question 33: If the equation $y = mx + 3$ represents a line that passes through the given point, determine the value of m.

$(-3, 7)$

Lecture Video <

Solution Video

Question 34: If the equation $y = mx + 3$ represents a line that passes through the given point, determine the value of m.

$(8, 2)$

Lecture Video <

Solution Video

Question 35: Determine the equation of the line described below.

has an x-intercept of 4 and a y-intercept of -3

Lecture Video <

Solution Video

Question 36: The LeBlanc family is driving home. The LeBlance are using cruise control so their speed is constant. After 3h, they are 350 km from home. After 5h, they are 130 km from home.

a) Write an equation to represent this distance-time relationship.

b) What do the slope and y-intercept of your equation mean in this situation?

Lecture Video <

Solution Video

Question 37: The local fall fair charges a flat fee for admission plus an additional cost for ride tickets. Last year, Kelsey purchased 15 tickets and spent a total of $\$19.50$. His brother Quinn purchased 36 tickets and spent a total of $\$30.00$ at the fair.

a) Determine an equation to represent the relationship between the total amount of money spent and the number of tickets purchased.

b) A ride pass, which gives a person entrance to the part and unlimited use of the rides, cost $\$21$. Write the equation for the relationship between the total amount spent on a ride pass and the number of rides it can be used for.

c) Last year, Erin used 25 tickets at the fall fair. Should Erin purchase tickets again this year, or buy a ride pass? Explain.

d) Heather only likes the fun house, which requires one ticket. She went on this ride 10 times last year. How much money would Heather save by purchasing tickets instead of a ride pass?

Lecture Video <

Solution Video

Question 38: Lisa downloads music from the Music G site, which charges monthly membership fee plus an amount for each song downloaded. A three-month record of her activity on the site is shown.

$Month$	$NumberofSongsDownloaded$	$MonthlyBill(\$)$
$January$	54	26.90
$February$	38	25.30
$March$	21	23.60

(a) Use two points from the table to determine the equation of the relationship between number of downloads and her monthly bill.

(b) Lisa's brother thinks she should change to Web W, which doesn't have a membership fee and charges $\$0.95$ per song. If Lisa download more than $\$25$/month, she should switch the plan to Web W?

Lecture Video <

Solution Video

Question 39: Determine the equation of the **median** from Q to the midpoint of PR, in triangle PQR, with

$P(4,8), Q(3,2)$, and $R(6,4)$.

Lecture Video <

Solution Video

Question 40: Given any two points on a line, the equation of the line can be determined from the point-slope form of the equation of the line:

$y = m(x - p) + q$

Lecture Video <

Solution Video

Question 41: Given any two points on a line, the equation of the line can be determined to form the point-slope form of the equation of the line: $y = m(x - p) + q$.

Substitute the coordinates into the slope formula $\dfrac{y - q}{x - p} = m$ then isolate y.

Lecture Video <

Solution Video

Question 42:

- Use the point-slope form: $y = m(x - p) + q$

of the equation of a line to determine the equations of the line that has a slope of 3 and passes through the point $(1, 2)$.

- Determine the equation of the line in part (b) using $y = mx + b$ to verify that he new formula works.

Lecture Video <

Solution Video

Question 43: Use the point-slope form $y = m(x - p) + q$

of the quatrain of a line to determine the equation for each of the following lines.

- i) passing through points $(4, -6), (5, -1)$
- ii) passing through points $(3, -1), (9, 3)$
- iii) passing through points $(4, 5), (3, 9)$

Lecture Video

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Solution Video

5.5 Parallel and Perpendicular Lines

Question 1: State an equation of a line parallel to $y = -\frac{3}{2}x + 9$.

Lecture Video <

Solution Video

Question 2: Write the equation of a line parallel to the x-axis that passes through the point (1, 4).

Lecture Video <

Solution Video

Question 3: Write the equation of a line parallel to the x-axis that passes through the point (3, -8).

Lecture Video <

Solution Video

Question 4: In general, what is true about the equation of any line parallel to the x-axis?

Lecture Video <

Solution Video

Question 5: Write the equation of a line parallel to the y-axis that passes through the point (-9, 3).

Lecture Video <

Solution Video

Question 6: Write the equation of a line parallel to the y-axis that passes through the point (6, 2).

Lecture Video <

Solution Video

Question 7: In general, what is true about the equation of any line parallel to the y-axis?

Lecture Video <

Solution Video

Question 8: Use the given information to write the equation of each line.

A line parallel to the line defined by $y = 3x + 5$ and passing through the point $(3, -5)$

Lecture Video <

Solution Video

Question 9: Use the given information to write the equation of each line.

A line parallel to the line defined by $3x + 2y = 7$ with y-intercept = 3

Lecture Video <

Solution Video

Question 10: Determine the value of k in each graph.

Lecture Video <

Solution Video

Question 11: A line segment has endpoints $A(1, -5)$ and $B(4, 1)$.

- Determine the coordinate of two points, C and D, that would make ABCD a parallelogram.

Lecture Video <

Solution Video

Question 12: State an equation of a line perpendicular to $y = -\frac{3}{2}x + 9$.

Lecture Video <

Solution Video

Question 13: Use the given information to write the equation of each line.

A line perpendicular to the line defined by $y = 3x + 5$ and passing through the point $(3, -5)$

Lecture Video <

Solution Video

Question 14: Use the given information to write the equation of each line.

A line perpendicular to the line defined by $2x - 3y + 18 = 0$ with the same y-intercept

Lecture Video <

Solution Video

Question 15: Determine the equation of a line perpendicular to $4x - 3y - 2 = 0$ with the same y-intercept as the line defined by $3x + 4y = -12$.

Lecture Video <

Solution Video

Question 16: Determine the equation of a line perpendicular to $2x - 5y = 6$ with the same x-intercept as the line defined by $3x + 8y - 15 = 0$.

Lecture Video

Solution Video

Question 17: Determine the value of k in each graph.

Lecture Video

Solution Video

Question 18: A line segment has endpoints $A(1, -5)$ and $B(4, 1)$.

- Determine the coordinate of two points, C and D, that would make ABCD a rectangle.

Lecture Video

Solution Video

Question 19: A line segment has endpoints $A(1,-5)$ and $B(4,1)$.

- Determine the coordinate of two points, C and D, that would make ABCD a square.

Lecture Video <

Solution Video

Question 20: Determine which of the following lines are parallel and which are perpendicular to each other.

(a) $y = -\frac{1}{3}x + 2$

(b) $y = -3x + 2$

(c) $y = \frac{7}{2}x - 4$

(d) $y = \frac{2}{7}x - 3$

(e) $y = \frac{1}{3}x + 1$

(f) $y = \frac{1}{-3}x - 8$

(g) $y = \frac{-3}{9}x$

(h) $y = \frac{-2}{7}x - 9$

Lecture Video <

Solution Video

Question 21: For the pair of equations, state whether the lines are parallel, perpendicular, or neither.

$y = 2x + 5$

$y = -\frac{1}{2}x - 4$

Lecture Video

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Solution Video

Question 22: For the pair of equations, state whether the lines are parallel, perpendicular, or neither.

$y = \frac{2}{3}x - 2$

$y = -1.5x - 6$

Lecture Video <

Solution Video

Question 23: For the pair of equations, state whether the lines are parallel, perpendicular, or neither.

$y = \frac{3}{7}x - 4$

$y = -\frac{3}{7}x - 4$

Lecture Video <

Solution Video

Question 24: For the pair of equations, state whether the lines are parallel, perpendicular, or neither.

$x - 4y = 2$

$2x - 8y = 3$

Lecture Video <

Solution Video

Question 25: For the pair of equations, state whether the lines are parallel, perpendicular, or neither.

$y = -0.2x - 1$

$y = -\frac{1}{5}x + 3$

Lecture Video <

Solution Video

Question 26: For the pair of equations, state whether the lines are parallel, perpendicular, or neither.

$x - 5y + 8 = 0$

$5x - y = 0$

Lecture Video <

Solution Video

Question 27: Are the lines defined by the equations $y = 4$ and $x = 3$ parallel, perpendicular, or neither? Explain.

Lecture Video <

Solution Video

Question 28: The following set of points define the endpoints of line segments. Determine which line segments are parallel and which line segments are perpendicular.

$A(6,5)$ and $B(12,3)$

$P(-3,-4)$ and $Q(5,20)$

$G(0,-4)$ and $H(6,-2)$

$U(-5,9)$ and $V(-6,12)$

$K(2,4)$ and $L(6,16)$

Lecture Video <

Solution Video

Question 29: For the given vertices, determine whether or not $\triangle$ ABC is a right triangle.

$A(13,3), B(3,5)$, and $C(-2,-20)$

Lecture Video <

Solution Video

Question 30: For the given vertices, determine whether or not $\triangle$ ABC is a right triangle.

$A(5,4), B(-1,2)$, and $C(2,-1)$

Lecture Video <

Solution Video

Question 31: Show algebraically that the points $A(-4,7), B(6.5,1), C(-8,0)$, and $D(2.5,-6)$ form a rectangle.

Lecture Video <

Solution Video

Question 32: $\overline{\mathrm{AM}}$ is a median. Show that $\overline{\mathrm{AM}}$ is perpendicular to $\overline{\mathrm{BC}}$.

Lecture Video <

Solution Video

Question 33: ABCD is a rhombus. Show that the diagonals of the rhombus are perpendicular to each other.

Lecture Video <

Solution Video

Analytical Geometry Chapter Review

Question 1: Identify the slope and y-intercept for each line.

$a)\quad y = 3x + 4 \qquad c)\quad y = -1.11 + 9.7x$
$b)\quad y = -\frac{2}{5}x - 6.8 \qquad d)\quad y = 3$

Lecture Video <

Solution Video

Question 2: Order the set of lines from closest to horizontal to closest to vertical.

$y = 2x - 4$
$y = x + 8$
$y = \frac{1}{3}x - 2$

Lecture Video <

Solution Video

Question 3: Order the set of lines from closest to horizontal to closest to vertical.

$y = -\frac{1}{3}x + 5$
$y = -8x - 2$
$y = -\frac{5}{2}x + 3$

Lecture Video <

Solution Video

Question 4: Copy and complete the table to identify whether the lines will rise or fall to the right.

$Equation$	$RisestotheRight$	$FallstotheRight$
$y = 4x + 5$		
$y = -\frac{2}{3}x - 8$		
$y = -2.8x + 4$		
$y = \frac{21}{8}x$		
$y = 1.5x + 4.5$		

Lecture Video <

Solution Video

Question 5: Determine the slope and y-intercept.

$3x - 4y + 9 = 0$

Lecture Video <

Solution Video

Question 6: Determine the slope and y-intercept.

$5x - y = 12$

Lecture Video <

Solution Video

Question 7: Determine the slope and y-intercept.

$2x + 6y = 32$

Lecture Video <

Solution Video

Question 8: Determine the slope and y-intercept.

$8x + 2y - 4 = 0$

Lecture Video <

Solution Video

Question 9: Evan and Sara shovel driveway in the winter time to earn some money. They charge $10 for a double driveway and $5 for a single driveway. This past winter, Min earned $255 and Steve earned $230.

a. Write equations for both Evan and Sarah to represent the relationship between the amounts earned shovelling single and double driveways.

b. Isolate the variable used for single driveways in both equations.

c. If they both shovelled 10 double driveways, how many single driveways did each shovel?

Lecture Video <

Solution Video

Question 10: Calculate the slopes of the line segments shown below.

Lecture Video

Solution Video

Question 11: Determine the equation of each line.

Lecture Video

Solution Video

Question 12: Calculate the slopes of the lines that pass through each of the following pairs of points.

A(8, 2) and B(1, 9)

Lecture Video

Solution Video

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Question 13: Calculate the slopes of the lines that pass through each of the following pairs of points.

E(-1, 5) and F(3, 2)

Lecture Video <

Solution Video

Question 14: Calculate the slopes of the lines that pass through each of the following pairs of points.

C(-1, 2) and D(3, -8)

Lecture Video <

Solution Video

Question 15: Calculate the slopes of the lines that pass through each of the following pairs of points.

G(-3, 2) and H(-9, -11)

Lecture Video <

Solution Video

Question 16: The points $(-6,-3)$, $(k,1)$, and $(8,4)$ are collinear. Determine the value of k.

Lecture Video

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Solution Video

Question 17: Three hours after beginning her long-distance bicycle trip, Cathy was 98 km from home. After seven hours, she was 182 km from home. Assuming she maintained the same speed throughout the trip, how fast was she cycling?

Lecture Video

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Solution Video

Analytical Geometry Chapter Test

Chapter 6 Data Relationships

6.1 Interpreting Data

Question 1: The scatter plot shows the sales of bottled water at a refreshment booth at the Canadian National Exhibition in Toronto for different days during a heat wave one summer.

a. What information does point A represent? What does point B represent?

b. What does the scatter plot show about the relationship between water sales and temperature?

Lecture Video

Solution Video

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Question 2: The scatter plot shows the ages of some tractors and their values.

a. Identify the independent variable and the dependent variable.

b. Would you consider the variables to be discrete or continuous? Would you use a dashed line or a solid line to join the points?

c. Does the scatter plot suggest a relationship between the age of a tractor and its value? Explain.

Lecture Video

Solution Video

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Question 3:

$Speed(\mathrm{km/h})$	3	8	11	16	21	26	32	40	50	60	64	67	71
$FuelConsumption(\mathbf{L/100}\mathrm{km})$	14.9	5.3	4.7	3.8	3.5	3.3	3.2	3.1	3.1	3.1	3.1	3.8	3.9

a. Draw a scatter plot of the data.

b. Describe any pattern you see.

c. Does the pattern you described in part b) seem reasonable? Explain.

d. Does the pattern you described in part b) suggest how you should drive in order to minimize fuel consumption?

e. Who would want this information? Why?

f. Are the variables discrete or continuous?

g. Which variable did you choose for the independent variable? Explain.

Lecture Video

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Solution Video

Question 4: This table shows the birth rates in four provinces over the last few years.

Number of Births per 1000 People

$Year$	$Alberta$	$BritishColumbia$	$NewfoundlandandLabrador$	$Ontario$
2001	12.4	9.8	8.8	10.9
2002	12.8	9.9	8.8	10.8
2003	12.9	9.7	8.9	10.9
2004	12.9	9.7	8.6	10.8
2005	12.7	9.6	8.6	10.6

a. Draw a scatter plot of the number of births for this five—year period for each province on a single grid.

b. Do any provincial data show a strong pattern?

Lecture Video <

Solution Video

Question 5: The data below show the number of car accidents in a year for different age groups.

$AgeGroup$	$NumberofAccidents$
$16-19$	6382
$20-24$	7183
$25-34$	11733
$35-44$	8990
$45-54$	5517
$55-64$	3307
$65-74$	2308

a. Choose an independent variable and a dependent variable. Explain how you chose.

b. Draw a scatter plot of the data. Use the median age for each age group.

c. Describe any trends you see in the scatter plot.

d. s it appropriate to connect the plotted points with a line? If so, should the line be solid or broken? Explain.

e. Veera says that young people have more car accidents than old people. Are there sufficient data to support this claim? If not, what further information would be helpful? Explain.

Lecture Video <

Solution Video

6.2 Lines of Best Fit

Question 1: This scatter plot shows the monthly profit for a car dealership when a certain number of cars are sold.

a. Use the graph to estimate the monthly profit in a month where 23 cars are sold.

b. Use the graph to estimate the number of cars sold in a month where the profit is $67000.

Lecture Video <

Solution Video

Question 2: In this table, x represents the number of people enrolled in various classes at a health club, and y represents the number in each class that are male.

x	19	10	6	16	15	9	12	21
y	10	4	2	5	7	3	8	8

a. Construct a scatter plot for the data.

b. Sketch a line of best fit.

c. Use the line of best fit to estimate the value of y when $x = 14$.

d. Use the line of best fit to estimate the value of y when $x = 27$.

Lecture Video <

Solution Video

Question 3: A chair company has a contract to build all 1790 seats in a concert hall. The progress over the first week of work is shown in the table.

$Number of Days$	1	2	3	4	5	6	7
Total Number of Seats Completed	97	204	327	443	539	661	795

a. Estimate the number of seats built after 9 days. How many are built by the middle of day 5?

b. Estimate the number of days needed to build 1252 seats.

c. The company gets a bonus if it is able to finish all of the seats in two weeks or less. If the workers continue to make chairs at about the same rate in the second week, will the company be able to collect the bonus?

Lecture Video

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Solution Video

Question 4: Kim is on her school basketball team. This table shows her statistics for n the first 10 games of the season. (Each field goal made counts for two points. and each free throw made counts for one point.)

Game	Minutes Played	Field Goals		Free Throws		Points
		Made	Attempted	Made	Attempted	
1	32	5	13	4	6	14
2	30	4	10	3	3	11
3	24	2	6	1	1	5
4	29	1	3	2	4	4
5	36	3	6	0	1	6
6	19	5	11	2	2	12
7	12	0	3	0	4	0
8	21	1	5	1	2	3
9	18	3	5	1	5	7
10	19	3	7	2	6	8

- Use a line of best fit to estimate the number of field goals Kim would make if nine were attempted.

Lecture Video <

Solution Video

Question 5: Kim is on her school basketball team. This table shows her statistics for n the first 10 games of the season. (Each field goal made counts for two points. and each free throw made counts for one point.)

Game	Minutes Played	Field Goals		Free Throws		Points
		Made	Attempted	Made	Attempted	
1	32	5	13	4	6	14
2	30	4	10	3	3	11
3	24	2	6	1	1	5
4	29	1	3	2	4	4
5	36	3	6	0	1	6
6	19	5	11	2	2	12
7	12	0	3	0	4	0
8	21	1	5	1	2	3
9	18	3	5	1	5	7
10	19	3	7	2	6	8

- Use a line of best fit to estimate the number of points Kim would score if she played for 40 min.

Lecture Video <

Solution Video

6.3 Curves of Best Fit

6.4 Reasoning About Data

6.5 Describing Situations from Graphs

Question 1: Match each story to a graph on the next page that best describes the story.

a. Michael walks to school at a steady pace. He waits once for a stop light and continues to school at a faster pace. After being at school, he returns home without stopping or slowing down.

b. A log floating in a slow, steadily moving river goes through two sets of rapids before going over a waterfall into a lake.

c. A taxi driver charges a passenger to get in the cab plus a fixed amount for every 100 m.

d. A skydiver enters a plane that takes OH and climbs at a steady rate. He jumps out and free-falls until the parachute opens. He descends the rest of the way at a constant speed.

Lecture Video

Solution Video

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Question 2: This graph shows how an all terrain vehicle (ATV) travels over time.

a) Over what interval of time is the ATV travelling the slowest? the fastest?

b) When does the ATV start to return to its starting point? When does it get there?

c) Determine the slope of the graph between 20 s and 26 s.

d) What does a zero slope mean in the context of this graph?

Lecture Video

Solution Video

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Question 3: Describe a situation that could match this graph.

Lecture Video

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Solution Video

Question 4: Write a story for the graph.

Lecture Video <

Solution Video

Question 5: Write a story for the graph.

Lecture Video <

Solution Video

Question 6: Water is poured into this container at a constant rate. Draw a graph that represents this situation where d is depth and t is time.

Lecture Video <

Solution Video

Question 7: A race car travels around a race track. The graph of speed vs. time for the first lap by the car is shown. a) What do the increasing parts of the graph represent? the decreasing parts?

b) What do the horizontal parts of the graph represent?

c) Using the graph, tell a story about the car as it makes its first lap around the track.

Lecture Video <

Solution Video

Question 8: Draw a graph of speed versus time as a car makes one circuit of each track. The arrow shows the direction the car is moving.

Lecture Video <

Solution Video

Question 9: Draw a graph of speed versus time as a car makes one circuit of each track. The arrow shows the direction the car is moving.

Lecture Video <

Solution Video

Question 10: Draw a graph of speed versus time as a car makes one circuit of each track. The arrow shows the direction the car is moving.

Lecture Video <

Solution Video

Question 11: Draw a graph of speed versus time as a car makes one circuit of each track. The arrow shows the direction the car is moving.

Lecture Video <

Solution Video

Question 12: Plot each set of data, and then, determine if it represents a linear or nonlinear relationship. Justify your decision. 2. In each set of data, determine if the object is accelerating, decelerating, moving at a constant velocity, or a combination of all three.

$Time(s)$	$Distance(m)$
7	19
8	22
9	25
10	28
11	31

Lecture Video <

Solution Video

Question 13:

1. Plot each set of data, and then, determine if it represents a linear or nonlinear relationship. Justify your decision.
2. In each set of data, determine if the object is accelerating, decelerating, moving at a constant velocity, or a combination of all three.

$Time(s)$	$Distance(m)$
0	0
1	7
2	16
3	29

Lecture Video <

Solution Video

Chapter Review

Question 1: The scatter plot below shows the graphics quality (on a scale of1 to 10) foraVideo game when it is played on various computers.

a. Is the line of best fit appropriate? If so, explain why. If not, sketch a more appropriate one.

b. Determine the equation of the most appropriate line of best fit.

Lecture Video

Solution Video

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Question 2: The scatter plot shows the population of a colony of wolves in a wilderness region of Northern Ontario.

a. Explain whether the line of best fit is appropriate.

b. Would a curve of best fit be more appropriate? If so, sketch one. If not, explain why not.

c. Might both a line of best fit and a curve of best fit be appropriate? Explain.

Lecture Video

Solution Video

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Question 3: Do you think that the number of chess grandmasters in a country is related to the size of its population?

a. Formulate a conjecture about the relationship.

b. Consider the data for a sample of countries. Plot the data on a scatter plot.

$ShoeSize$	8.5	9.0	9.0	10.0	10.5
$Height(cm)$	166	174	169	178	175

$ShoeSize$	10.5	11.0	11.5	12.0	12.5
$Height(cm)$	183	187	182	190	184

c. If possible, sketch a line or curve of best fit.

d. Is there a relationship between the variables? If so, describe it.

e. Suggest other influences on the number of grandmasters in a country.

Lecture Video

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Solution Video

Question 4: A hotel courtesy bus takes David from the airport to his hotel. Use the Distance versus Time graph to create a story that traces the route of the bus.

Lecture Video

Solution Video

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Chapter Test

Question 1: The scatter plot at the bottom shows the amount of food eaten in a day by dogs of various masses. If the line of best fit is appropriate, explain why. If it is not appropriate, explain how you would draw

an appropriate line.

Lecture Video <

Solution Video

Question 2: Grant leads a team of high school students who speak to elementary school students about the health problems that result from smoking cigarettes. Each high school student is responsible for one elementary school. Data on the number of hours spent by each high school student (in a year) and the corresponding number of smokers in each elementary school are summarized in the table.

$SpeakingTime(h)$	24	31	40	41	50	29	38	62	47
$NumberofSmokers$	36	27	16	10	3	23	20	1	19

a. Plot the data on a scatter plot.

b. Describe the pattern in the data.

c. Sketch a line or curve of best fit, whichever is more appropriate.

d. Can you conclude that the program of speaking to elementary school students has been effective in reducing smoking? Explain.

Lecture Video <

Solution Video

Question 3: Shasta runs one kilometre each day as part of her daily exercise. The graph shows her 500

distance from home as she runs her route.

a. Between what two points does Shasta run the fastest?

b. Describe what is happening between points C and D.

c. When does Shasta begin to travel toward home?

d. How long does it take her to get home?

e. How fast was she running back home?

Lecture Video

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Solution Video

Chapter 4 to 6 Cumulative Review; Lines and Linear Relationship

Select the line that best represents the line of best fit for this scatter plot.

A.

C.

B.

D.

Question 1:

Lecture Video

Solution Video

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Question 2: Use the line of best fit to predict the amount of rainfall for the ninth month of the year.

A. 50 mm

B. 40 mm

C. 30 mm

D. 20 mm

Lecture Video

Solution Video

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Chapter 7 2-D Geometry

7.0 Getting Started

Question 1: Find the angles for the missing values.

Lecture Video <

Solution Video

Question 2: Find the angles for the missing values.

Lecture Video <

Solution Video

Question 3: Find the missing value.

Lecture Video <

Solution Video

Question 4: Determine the value of the missing angles.

Lecture Video

Solution Video

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Question 5: Determine the value of the missing angles.

Lecture Video

Solution Video

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Question 6: Find the missing value.

Lecture Video

Solution Video

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Question 7: Find the missing value.

Lecture Video <

Solution Video

Question 8: Find the missing value.

Lecture Video <

Solution Video

7.1 Exploring Interior Angles of Polygons

Question 1: Copy the following polygons. Draw as many non-intersecting diagonals as possible to create non—overlapping triangles. What is the sum of the interior angles in each case?

Lecture Video <

Solution Video

Question 2: Copy the following polygons. Draw as many non-intersecting diagonals as possible to create non—overlapping triangles. What is the sum of the interior angles in each case?

Lecture Video <

Solution Video

Question 3: Copy the following polygons. Draw as many non-intersecting diagonals as possible to create non—overlapping triangles. What is the sum of the interior angles in each case?

Lecture Video <

Solution Video

Question 4: Copy the following polygons. Draw as many non-intersecting diagonals as possible to create non—overlapping triangles. What is the sum of the interior angles in each case?

Lecture Video

Solution Video

Question 5: Calculate the sum of the interior angles of each polygon.

Lecture Video

Solution Video

Question 6: Calculate the sum of the interior angles of each polygon.

Lecture Video

Solution Video

Question 7: Calculate the sum of the interior angles of each polygon.

Lecture Video <

Solution Video

Question 8: Calculate the sum of the interior angles of each polygon.

Lecture Video <

Solution Video

Question 9: Polygon A is a regular 10-gon and polygon B is an irregular 10-gon. Are the sums of their interior angles equal? Explain.

Lecture Video <

Solution Video

Question 10: What is the measure of each interior angle of a regular 14-gon?

Lecture Video

Solution Video

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Question 11: The sum of the interior angles in a polygon is 1440°. How many sides does the polygon have?

Lecture Video

Solution Video

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7.2 Angle Properties of Polygons

Question 1: What is the relationship between the interior angle and the exterior angle at each vertex of a polygon?

Lecture Video

Solution Video

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Question 2: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 3: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 4: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 5: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 6: In this diagram, $\angle E$ in $\triangle BEC$ is a right angle. What is the sum of angles a and d?

Lecture Video

Solution Video

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Question 7: What is the measure of $\angle CAB$ in this diagram?

Lecture Video

Solution Video

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Question 8: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 9: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 10: For each diagram, state the equation that expresses the relationship needed to solve the problem. Then, determine the measure of each variable. Show the steps in the solution.

Lecture Video

Solution Video

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Question 11: For each diagram, state the equation that expresses the relationship needed to solve the problem. Then, determine the measure of each variable. Show the steps in the solution.

Lecture Video

Solution Video

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Question 12: For any regular n-gon, developed a formula for calculating the measure of each interior angle. Explain your steps.

Lecture Video

Solution Video

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Question 13: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 14: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 15: An interior angle of a parallelogram is the measure of the exterior angle adjacent to it multiplied by 4. Determine the measure of each interior angle. Draw the parallelogram.

Lecture Video

Solution Video

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Question 16: In $\triangle$ ABC, the measure of$\angle B$ is 21° less than the angle of $\angle A$ multiplied by 4. The measure of $\angle C$ is 1° more than the measure of $\angle A$ multiplied by 5. Determine the measure of each interior angle and each exterior angle of $\triangle ABC$.

Lecture Video <

Solution Video

Question 17: In the diagram, AB is parallel to FG and BC is parallel to DE.

- What is the relationship between $\angle 1$ and $\angle 2$?

Lecture Video <

Solution Video

Question 18: Determine the measure of each missing angle in this parallel line setup.

Lecture Video <

Solution Video

Question 19: Determine the measure of each missing angle.

Lecture Video

Solution Video

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Question 20: For each diagram, state the equation that expresses the relationship needed to solve the problem. Then, determine the measure of each variable. Show the steps in the solution.

Lecture Video

Solution Video

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Question 21: For each diagram, state the equation that expresses the relationship needed to solve the problem. Then, determine the measure of each variable. Show the steps in the solution.

Lecture Video

Solution Video

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Question 22: In a regular polygon, the ratio of the measure of the exterior angle to the measure of its adjacent interior angle is 1 to 4. How many sides does the polygon have?

Lecture Video

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Solution Video

7.3 Exploring Quadrilateral Diagonal Properties

Question 1: Each quadrilateral ABCD below has these three vertices: A(0, 0), B(3, 4), and C(8, 4). Use diagonal properties to identify the coordinates of the fourth vertex D in each case. Explain your method.

- rhombus

Lecture Video <

Solution Video

Question 2: Each quadrilateral ABCD below has these three vertices: A(0, 0), B(3, 4), and C(8, 4). Use diagonal properties to identify the coordinates of the fourth vertex D in each case. Explain your method.

- isosceles trapezoid

Lecture Video <

Solution Video

Question 3: Each quadrilateral ABCD below has these three vertices: A(0, 0), B(3, 4), and C(8, 4). Use diagonal properties to identify the coordinates of the fourth vertex D in each case. Explain your method.

- kite

Lecture Video <

Solution Video

Question 4: Match each pair of diagonals with its quadrilateral. Explain your reasoning.

Lecture Video

Solution Video

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Mid Chapter Review

Question 1: Determine the measure of the missing interior angle.

Lecture Video <

Solution Video

Question 2: Determine the measure of the missing interior angle.

Lecture Video <

Solution Video

Question 3: Determine the measure of the missing interior angle.

Lecture Video <

Solution Video

Question 4: Determine the measure of the missing interior angle.

Lecture Video

Solution Video

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Question 5: Determine the measure of the missing interior angle.

Lecture Video

Solution Video

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Question 6: Determine the measure of the missing interior angle.

Lecture Video

Solution Video

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Question 7: Determine the measure of the missing angle. Support your answer with mathematical reasoning.

Lecture Video

Solution Video

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Question 8: Determine the measure of the missing angle. Support your answer with mathematical reasoning.

Lecture Video

Solution Video

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Question 9: Determine the measure of the missing angle. Support your answer with mathematical reasoning.

Lecture Video

Solution Video

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Question 10: Determine the measure of the missing angle. Support your answer with mathematical reasoning.

Lecture Video

Solution Video

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Question 11: Complete the table for each regular polygon.

Figure	Measure of Each Interior Angle	Measure of Each Exterior Angle	Sum of Interior Angles	Sum of Exterior Angles

Lecture Video

Solution Video

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7.4 Reasoning About Triangle and Quadrilateral Properties

Question 1: Predict whether a polygon's sides are all equal if its interior angles are all equal. Support your conjecture with examples or disprove it with a counterexample.

Lecture Video <

Solution Video

Question 2: Predict whether a polygon's interior angles are all equal if its sides are all equal. Support your conjecture with examples or disprove it with a counterexample.

Lecture Video <

Solution Video

Question 3: Create a conjecture to predict the number of diagonals from any one vertex of a convex polygon with n sides. Support your conjecture with examples or disprove it with a counterexample.

Lecture Video <

Solution Video

Question 4: Test this conjecture: “If the midsegments of a quadrilateral form a square, then the quadrilateral is itself a square.”

Lecture Video <

Solution Video

Question 5: Test this conjecture: “The medians of a triangle always intersect at exactly one point.”

Lecture Video <

Solution Video

Question 6: Test this conjecture: “It is always possible to draw a circle through all four vertices in a rectangle.”

Lecture Video <

Solution Video

7.5 Reasoning About Properties of Polygons

Question 1: Remi is building a triangular wooden shelving unit. The base measures 30 cm and the slant sides measure 18 cm and 24 cm. He wants a horizontal shelf halfway between the base and the top. What

length of wood should he cut for the shelf?

Lecture Video <

Solution Video

Question 2: A trapezoid has parallel sides of length 51 cm and 144 cm. Its other sides measure 34 cm and 65 cm.

(a) Determine the length of the bimedian joining the two non-parallel sides.

Lecture Video <

Solution Video

Question 3: A trapezoid has parallel sides of length 51 cm and 144 cm. Its other sides measure 34 cm and 65 cm.

(b) The distance between the parallel sides is 8 cm. How far is the bimedian from each?

Lecture Video <

Solution Video

Chapter Review Reasoning with Geometry

Question 1: Calculate the missing angle.

Lecture Video <

Solution Video

Question 2: Calculate the missing angle.

Lecture Video <

Solution Video

Question 3: Calculate the value of x.

Lecture Video <

Solution Video

Question 4: Billy claims that the sum of the interior angles of a regular octagon is 900°. Is he correct? Justify your decision.

Lecture Video <

Solution Video

Question 5: a) Calculate the measure of each interior angle of a regular 25- gon.

b) What is the measure of each exterior angle?

Lecture Video <

Solution Video

Question 6: Find the value of the unknown.

Lecture Video <

Solution Video

Question 7: Find the value of the unknown.

Lecture Video <

Solution Video

Question 8: The formula for calculating the sum of the interior angles of any n-gon is $(n-2) \times 180^o$

- Explain why 2 is subtracted from n.

Lecture Video <

Solution Video

Question 9: The formula for calculating the sum of the interior angles of any n-gon is $(n-2) \times 180^o$

- Explain why $(n-2)$ is multiplied by 180°.

Lecture Video <

Solution Video

Question 10: Find the value of the unknown.

Lecture Video <

Solution Video

Question 11: Find the value of the unknown.

Lecture Video <

Solution Video

Question 12: Calculate the value of x.

Lecture Video <

Solution Video

Question 13: Describe the possible type(s) of quadrilateral that could be made with each set of diagonals.

Justify your answers.

Lecture Video <

Solution Video

Question 14: Describe the possible type(s) of quadrilateral that could be made with each set of diagonals.

Justify your answers.

Lecture Video <

Solution Video

Question 15: Describe the possible type(s) of quadrilateral that could be made with each set of diagonals.

Justify your answers.

Lecture Video <

Solution Video

Question 16: Describe the possible type(s) of quadrilateral that could be made with each set of diagonals.

Justify your answers.

Lecture Video <

Solution Video

Question 17: A trapezoid has parallel sides 6 cm and 46 cm. The other sides measure 37 cm and 13 cm.

a) Determine the length of the bimedian joining the two non—parallel sides.

b) The distance between the parallel sides is 12 cm. How far is the bimedian from each?

Lecture Video <

Solution Video

Question 18: Draw a circle and plot four points on it. Join adjacent points to form a quadrilateral. Extend a

side at each vertex.

a) Compare each interior angle with the exterior angle at the opposite vertex. What do you notice?

b) Repeat your angle measurements for a quadrilateral whose vertices cannot all be plotted on one circle.

c) Form a conjecture from your observations, and explain how to test it.

Lecture Video

Solution Video

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Chapter Test Properties of 2D figures

Question 1: Determine the missing angles.

Lecture Video <

Solution Video

Question 2: Determine the missing angles.

Lecture Video <

Solution Video

Chapter 8 3D Geometry

8.1 Determining Optimum Area and Perimeter

Question 1: Each rectangle has a perimeter of 64 units. Which one has the greatest area?

Lecture Video

Solution Video

Question 2: Determine the maximum area of a rectangle with each perimeter, to one decimal place.

- P = 100 cm

Lecture Video

Solution Video

Question 3: Determine the maximum area of a rectangle with each perimeter, to one decimal place.

- P = 72 m

Lecture Video

Solution Video

Question 4: Determine the maximum area of a rectangle with each perimeter, to one decimal place.

- P=169 km

Lecture Video <

Solution Video

Question 5: Determine the maximum area of a rectangle with each perimeter, to one decimal place.

- P= 143 mm

Lecture Video <

Solution Video

Question 6: Sarah is fencing a vegetable garden to keep rabbits out. The hardware store sells fencing for $\$25.50/m$. Her family has $\$165$ to spend. What dimensions should Sarah use to build a garden with the greatest area?

Lecture Video <

Solution Video

Question 7: The same piece of string was used to create these three rectangles. Which one has the maximum area? Explain your thinking.

Lecture Video

Solution Video

Question 8: A rectangular, indoor fish pond is being added to the lobby of a hotel. The budget allows for a stone border of 36 m around the pond. What dimensions will create a pond with the greatest area? How do you know?

Lecture Video

Solution Video

Question 9: Determine the dimensions of a rectangle with a perimeter of 40 cm and the greatest possible area.

Lecture Video

Solution Video

Question 10: Randy is building a rectangular, fenced dog run beside his barn. He has 120 m of fencing and plans to use the side of the barn as one side of the fenced area. What are the dimensions of a dog run that

maximize the area Randy can enclose?

Lecture Video <

Solution Video

Question 11: A farmer has $\$3600$ to spend on fencing for three adjoining rectangular pastures, as shown. The pastures all have the same dimensions. A local contracting company charges $\$6.25/m$ for fencing.

What is the largest area that the farmer can enclose?

Lecture Video <

Solution Video

Question 12: Draw rectangle with areas of 36 square units on grid paper. Which one has the least perimeter?

Lecture Video <

Solution Video

Question 13: Determine the minimum length of wood needed to build a rectangular frame for an art sketch of each area, to one decimal place.

- A = 1 m^2

Lecture Video

Solution Video

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Question 14: Determine the minimum length of wood needed to build a rectangular frame for an art sketch of each area, to one decimal place.

- A = 70 cm^2

Lecture Video

Solution Video

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Question 15: Determine the minimum length of wood needed to build a rectangular frame for an art sketch of each area, to one decimal place.

- A = 15.4 cm^2

Lecture Video

Solution Video

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Question 16: Determine the minimum length of wood needed to build a rectangular frame for an art sketch of each area, to one decimal place.

- A = 28 cm^2

Lecture Video <

Solution Video

Question 17: An outdoor rectangular skating rink with an area of 126 m^2 will be built with one of its side lengths next to the community centre. To enclose the rink, 3 sides of fencing are needed.

$Width(\mathrm{m})$	1	2	3	4	6	9	12	14	21	42
$Length(\mathrm{m})$										
$Perimeter(\mathrm{m})$										

- An outdoor rectangular skating rink with an area of 126 m^2 will be built with one of its side lengths next to the community centre. To enclose the rink, 3 sides of fencing are needed.

Lecture Video <

Solution Video

Question 18: What is the largest rectangular area that can be built with a 20 m fence in the corner of a building?

Create a table of values showing possible perimeters, widths, lengths, and areas.

Lecture Video <

Solution Video

8.2 Problems Involving Composite Shapes

Question 1: Calculate the shaded area of each figure.

Lecture Video

Solution Video

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Question 2: Calculate the shaded area of each figure.

Lecture Video

Solution Video

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Question 3: Calculate the perimeter and area of each shape.

Lecture Video

Solution Video

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Question 4: Calculate the perimeter and area of each shape.

Lecture Video

Solution Video

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Question 5: Calculate the shaded area of each figure.

Lecture Video

Solution Video

<

Question 6: Calculate the shaded area of each figure.

Lecture Video

Solution Video

<

Question 7: Calculate the shaded area of each figure.

Lecture Video

Solution Video

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Question 8: Calculate the area and perimeter of this shape.

Lecture Video

Solution Video

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Question 9: **(a)** Divide it into simpler polygons.

(b) Calculate the area of the shape. Explain your thinking.

Lecture Video

Solution Video

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Question 10: Calculate the shaded area of each figure.

Lecture Video

Solution Video

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Question 11: Calculate the shaded area of each figure.

Lecture Video

Solution Video

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Question 12: Determine an expression for the shaded area of each figure.

Lecture Video

Solution Video

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Question 13: Determine an expression for the shaded area of each figure.

Lecture Video

Solution Video

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Question 14: Calculate the area and perimeter of each regular polygon.

Lecture Video

Solution Video

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Question 15: Calculate the area and perimeter of each regular polygon.

Lecture Video

Solution Video

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Question 16: Calculate the area and perimeter of each regular polygon.

Lecture Video

Solution Video

Question 17: Calculate the length of one side of each regular polygon.

Lecture Video

Solution Video

Question 18: Calculate the length of one side of each regular polygon.

Lecture Video

Solution Video

Question 19: **(a)** Explain how you can calculate the area of this shape. Include what measurements you would need to know to calculate the area.

(b) Calculate the perimeter.

Lecture Video

Solution Video

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Question 20: Calculate the area and perimeter of this shape. Explain what you did.

Lecture Video

Solution Video

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Question 21: Determine an expression for the shaded area of each figure.

Lecture Video

Solution Video

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8.3 The Pythagorean Theorem

Question 1: Determine the missing length.

Lecture Video <

Solution Video

Question 2: Determine the missing length.

Lecture Video <

Solution Video

Question 3: Determine the missing length.

Lecture Video <

Solution Video

Question 4: Determine the missing length.

Lecture Video

Solution Video

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Question 5: What is the length of the direct flight path from Desaulniers to Callander?

Lecture Video

Solution Video

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Question 6: Calculate the missing length.

Lecture Video

Solution Video

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Question 7: Calculate the missing length.

Lecture Video <

Solution Video

Question 8: Calculate the missing length.

Lecture Video <

Solution Video

Question 9: A path is being constructed between the corners of the school playground, as shown. Determine the length of the path.

Lecture Video <

Solution Video

Question 10: Determine the length of the hypotenuse.

Lecture Video

Solution Video

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Question 11: Determine the length of the hypotenuse.

Lecture Video

Solution Video

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Question 12: Determine the length of the hypotenuse.

Lecture Video

Solution Video

<

Question 13: Determine the area of each square.

Lecture Video

Solution Video

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Question 14: Determine the lengths of the boom and the forestay to one decimal place.

Lecture Video

Solution Video

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Question 15: The outside play area of a daycare centre is shown. Show how you can use the Pythagorean theorem to ensure that the fence corners are at right angles.

Lecture Video

Solution Video

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Question 16: A Pythagorean triple is a group of three whole numbers that can represent the lengths of the sides of a right triangle. The smallest Pythagorean triple is 3, 4, 5. Which of the following are Pythagorean triples?

- 7, 24, 25

Lecture Video

Solution Video

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Question 17: A Pythagorean triple is a group of three whole numbers that can represent the lengths of the sides of a right triangle. The smallest Pythagorean triple is 3, 4, 5. Which of the following are Pythagorean triples?

- 3, 6, 8

Lecture Video

Solution Video

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Question 18: A Pythagorean triple is a group of three whole numbers that can represent the lengths of the sides of a right triangle. The smallest Pythagorean triple is 3, 4, 5. Which of the following are Pythagorean triples?

- 9, 21, 23

Lecture Video

Solution Video

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Question 19: A Pythagorean triple is a group of three whole numbers that can represent the lengths of the sides of a right triangle. The smallest Pythagorean triple is 3, 4, 5. Which of the following are Pythagorean triples?

- 31, 35, 38

Lecture Video

Solution Video

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Question 20: A box is 12 cm long, 5 cm wide, and 12 cm high. A cardboard rectangle is inserted along the diagonal to divide the box vertically into two equal spaces. Determine the dimensions of the cardboard rectangle.

Lecture Video

Solution Video

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Question 21: A square-based pyramid has a slant height of 100 m. Determine two possible sets of dimensions for the height and side length of the pyramid.

Lecture Video

Solution Video

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8.4 Surface Area of Right Pyramids and Cones

Question 1: Calculate the surface area of each type of candle.

Lecture Video

Solution Video

Question 2: Calculate the surface area of each type of candle.

Lecture Video

Solution Video

Question 3: Calculate the surface area of each shape.

Lecture Video

Solution Video

Question 4: Calculate the surface area.

Lecture Video

Solution Video

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Question 5: Calculate the surface area.

Lecture Video

Solution Video

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Question 6: Calculate the surface area.

Lecture Video

Solution Video

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Question 7: There are two shapes of snow—cone cups at the Fall Fair. Which cup uses less material?

Assume that the bases are regular polygons.

Lecture Video

Solution Video

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Question 8: Calculate the surface area of each regular pyramid.

Lecture Video

Solution Video

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Question 9: Calculate the surface area of each regular pyramid.

Lecture Video

Solution Video

<

Question 10: Calculate the surface area of each regular pyramid.

Lecture Video

Solution Video

<

Question 11: Calculate the surface area of each cone.

Lecture Video

Solution Video

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Question 12: Calculate the surface area of each cone.

Lecture Video

Solution Video

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Question 13: Calculate the surface area of each cone.

Lecture Video

Solution Video

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. Calculate the surface area of this pyramid.

Question 14:

Calculate the surface area of this pyramid.

Lecture Video

Solution Video

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Question 15: Salt is stored in a bin shaped like an inverted square-based pyramid. The sides of the base are 2.8 m long. The bin is 1.8 m high. Determine the surface area of the bin, including the square base.

Lecture Video

Solution Video

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Question 16: Determine the surface area of the tent. Include the floor in your calculation.

Lecture Video <

Solution Video

Question 17: Determine the surface area of a square pyramid with a height of 11.0 cm and a base area of 36.0 cm^2.

Lecture Video <

Solution Video

Question 18: Dennis bought a paperweight shaped like a regular hexagonal pyramid for his sister's birthday. It has a measure of 2.6 cm from the centre of its base to the midpoint of each side, a base perimeter of 18 cm, and a height of 4 cm. He wants to know if he has enough wrapping paper for it. Determine the pyramid's surface area.

Lecture Video <

Solution Video

Question 19: The Great Pyramid of Cheops was originally 147 m high. Its square base had a side length of 230.4 m.

Calculate the surface area of the Great Pyramid, including its base.

Lecture Video <

Solution Video

Question 20: Determine the slant height of a cone with a height of 8 cm and a radius of 4 cm.

Lecture Video <

Solution Video

Question 21: Calculate the surface area of a cone with slant height of a cone with a height of 8 cm and a radius of 4 cm.

Lecture Video <

Solution Video

Question 22: The Great Pyramid of Cheops was originally 147 m high. Its square base had a side length of 230.4 m.

The outside surface of each block in the Great Pyramid is 2.3 m by 1.8 m. Estimate the number of blocks that make up the outside facing of the Great Pyramid,

Lecture Video <

Solution Video

Question 23: Two regular octagonal pyramids are 8 cm high. Pyramid A has a surface area of 318.08 cm^2 and a measure of 6 cm from the centre of its base to the midpoint of each side. Pyramid B has a measure of 15 cm from the centre of the base to the midpoint of each side. What is the surface area of pyramid B?

Lecture Video <

Solution Video

Mid Chapter Review on Measurements

Question 1: Each rectangle has a perimeter of 48 units. Predict which has the greatest area. Explain.

Lecture Video <

Solution Video

Question 2: Calculate the maximum area for a rectangle with perimeter of 100 cm.

Lecture Video <

Solution Video

Question 3: Calculate the maximum area for a rectangle with perimeter of 20 m.

Lecture Video

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Solution Video

Question 4: Calculate the maximum area for a rectangle with perimeter of 24 km.

Lecture Video <

Solution Video

Question 5: Draw rectangles with areas of 72 square units on grid paper. Determine which rectangle has the least perimeter, and then, calculate its perimeter.

Lecture Video <

Solution Video

Question 6: Rosie is building a rectangular garden centre with an area of $98m^2$ attached to the side of her store. Determine the minimum length of wood needed for a fence on the three open sides.

Lecture Video <

Solution Video

Question 7: Aryn is creating this tile pattern. She wants to use a right triangle tile and several square tiles

around it. What is the area of each tile?

Lecture Video <

Solution Video

Question 8: A new covered walkway is being constructed to connect two malls. The rectangular space between the two malls is 8.0 m by 7.0 m. The walkway will connect the malls' opposite corners. How long is

the reference chalk line drawn between the corners?

Lecture Video <

Solution Video

Question 9: Determine the surface area of each shape.

Lecture Video <

Solution Video

Question 10: Determine the surface area of each shape.

Lecture Video

Solution Video

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Question 11: Janice needs to re-shingle the roof of her house. One bundle of shingles costs $\$35.99$ and covers 2.25 m^2.

a) How many bundles of shingles does she need for the roof?

b) What is the total cost of re-shingling the roof?

Lecture Video

Solution Video

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8.5 Volumes of Pyramids and Cones

Question 1: Calculate the volume of the gift box.

Lecture Video

Solution Video

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Question 2: Sammy has a regular octagonal-based pyramidal paperweight filled with coloured liquid. It has distance of 4.2 cm from the centre of tis base to the midpoint of each side, a base perimeter of 19.0 cm, and a height of 6.0 cm. Determine the volume of the pyramid.

Lecture Video

Solution Video

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Question 3: A pyramid and a prism with the same height both have a base area of 64 cm^2. How do their volumes compare?

Lecture Video

Solution Video

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Question 4: For each right pyramid, the base is a regular polygon with a=4 cm and h=10 cm.

Find the volume in term of s.

Lecture Video <

Solution Video

Question 5: Calculate the volume of the cone.

Lecture Video <

Solution Video

Question 6: Determine the volume of sand that would fill a cone with a base radius of 6.5 cm and a height of 12.0 cm.

Lecture Video <

Solution Video

Question 7: Calculate the volume of the cone.

Lecture Video

Solution Video

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Question 8: Sand for icy roads is stored in a conical pile 14.2 m high with a base diameter of 34.4 m.

a) Calculate the volume of the pile.

b) One sander can take 6.9 m^3 of sand. How many sanders can be filled from the pile?

Lecture Video

Solution Video

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Question 9: One conical paper cup for a water fountain has a height of 9 cm and a radius of 3 cm. An average of 45 cups of water is drunk each day. What volume of water is drunk each week?

Lecture Video

Solution Video

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Question 10: A square-based pyramid has a volume of 100 cm^3 and a base of 40 cm^2. What is its height?

Lecture Video <

Solution Video

Question 11: Candles in the shape of square-based pyramids are sold in three volumes: 75 cm^3, 150 cm^3, and 175 cm^3. The base side length of each candle is 5 cm. What are the heights of the candles?

Lecture Video <

Solution Video

8.6 Volume and Surface Area of a Sphere

Question 1: Calculate the surface area of a tennis ball with a radius of 3.0 cm.

Lecture Video <

Solution Video

Question 2: Calculate the surface area of a soccer ball with a radius of 12 cm. Explain what you did.

Lecture Video <

Solution Video

Question 3: Earth has a circumference of about 40 000 km. Estimate its radius to the nearest tenth of a kilometre and use the radius to calculate the surface area to the nearest hundred square kilometres.

Lecture Video <

Solution Video

Question 4: Frederic has a sphere of clay with a radius of 10 cm.

He also has a sphere of clay with a radius of 20 cm.

- How much foil would be needed to wrap the larger sphere compared to the smaller one?

Lecture Video <

Solution Video

Question 5: A baseball has an inner core covered with string. The ball's circumference is between 23 cm and 23.5 cm. Between what values must the surface area fall?

Lecture Video <

Solution Video

Question 6: Calculate the volume of the beach ball.

Lecture Video <

Solution Video

Question 7: Calculate how much water you would need to fill a round water ballon with a radius of 5 cm.

Lecture Video <

Solution Video

Question 8: Kim runs a company that makes ball bearings. The bearings are shipped in boxes that are then loaded onto trucks. Each bearing has a diameter of 0.96 cm.

a) Each box can hold 8000 cm^3 of ball bearings. How many ball bearings can a box hold?

b) Each ball bearing has a mass of 0.95 g. Determine the mass of each box.

c) The maximum mass a truck can carry is 11 000 kg. What is the maximum number of boxes that can be loaded into a truck?

d) Besides the ball bearings' mass, what else must Kim consider when loading a truck?

Lecture Video <

Solution Video

Question 9: Ice cream is sold to stores in cylindrical containers as shown. Each scoop of ice cream in a cone is a sphere with a diameter of $4.2cm$.

a) How many scoops of ice cream are in each container?

b) An ice cream cone with one scoop sells for $\$0.86$. How much money will the ice cream store charge for each full cylinder of ice cream that it sells in cones?

Lecture Video <

Solution Video

Question 10: Frederic has a sphere of clay with a radius of 10 cm. What additional volume of clay does he need to enlarge his sphere to one with a radius of 20 cm?

Lecture Video

Solution Video

Question 11: A pharmaceutical company creates a capsule for medication in the shape of a cylinder with hemispherical ends as shown. How much medication will the capsule hold?

Lecture Video

Solution Video

Question 12: A ballon is inflated to a radius of 10 cm. By how much will the radius increase if you add 1 L of air to the balloon?

Lecture Video

Solution Video

Question 13: Mars has a surface area of about $144800000km^2$.

Determine the circumference of Mars to the nearest hundred kilometres.

Lecture Video <

Solution Video

Question 14: **a)** Complete the table.

$Shape$	$SurfaceArea\ (\mathrm{cm}^2)$	$Dimensions(\mathrm{cm})$	$Volume\ (\mathrm{cm}^3)$
$square-basedprism$	1000	$s=10, h=x$	
$cylinder$	1000	$r=10, h=x$	
$sphere$	1000	$r \doteq x$	

b) Which shape has the greatest volume?

Lecture Video <

Solution Video

Question 15: A tennis ball has a radius of 3.4 cm. Three tennis ball fits into a cylindrical container. What is the volume of this cylinder when its empty?

Lecture Video <

Solution Video

Question 16: A cylinder just fit inside a 10 cm by 10 cm by 10 cm cubic box. Which shape has the smaller surface area? Verify your answer by determining the surface area of each shape.

Lecture Video

Solution Video

Question 17: Determine the surface area of a ball bearing with a volume of $6.75cm^3$.

Lecture Video

Solution Video

Question 18: Which has a larger volume: a sphere with a radius of r or a cube with side length of $2r$? Which has a larger surface area?

Lecture Video

Solution Video

8.8 Optimum Volume and Surface Area

Chapter Review

Question 1: Aryn is creating a rectangular outdoor space for her pet rabbit. Fencing material costs $15.25/m. She has $145. What dimensions give the greatest area, to the nearest tenth of a metre?

Lecture Video <

Solution Video

Question 2: What is the minimum perimeter possible for a rectangle with an area of $500cm^2$?

Lecture Video <

Solution Video

Question 3: Denzel wants to rope off a $800m^2$ rectangular swimming area using the beach as one of the sides. What should the dimensions of the rectangle be in order to use the minimum amount of rope?

Lecture Video <

Solution Video

Question 4: Sarah has 20 m of garden edging. What are the dimensions of the rectangular garden with the greatest area can she enclose with the edging?

Lecture Video

Solution Video

Question 5: Calculate the area of the figure.

Lecture Video

Solution Video

Question 6: A field has the dimensions shown.

a) Calculate the length of one lap of the track.

b) If Alice ran 625 m, how many laps did she run?

c) Calculate the area of the field.

Lecture Video

Solution Video

Question 7: Calculate the area and perimeter of each regular polygon.

Lecture Video <

Solution Video

Question 8: Calculate the area and perimeter of each regular polygon.

Lecture Video <

Solution Video

Question 9: A baseball diamond is a square. The distance between the bases is 27.4 m. Calculate the direct distance from first base to third base.

Lecture Video <

Solution Video

Question 10: Find the length of x accurate to the nearest tenth.

Lecture Video <

Solution Video

Question 11: Determine the length of the fence around the playground.

Lecture Video <

Solution Video

Question 12: A right triangle's legs are $20\ \mathrm{cm}$ and $48\ \mathrm{cm}$. What is the area of the square whose side length is equal to the hypotenuse?

Lecture Video <

Solution Video

Question 13: Calculate the surface area of the regular pyramid.

Lecture Video

Solution Video

<

Question 14: We want to paint the house shown below, including the door. For the roof, we want to re-shingle the entire roof. One 4L can of paint covers $35m^2$. One bundle of shingles covers 2.25 m^2

Height from the ground to peak = 5.0 m

a) How many bundles of shingles do they need for the roof? (Hint: Find the slant height of the roof first.)

b) How many cans of paint do they need?

c) One can of paint is $29.95 and one bundle of shingles is $35.99. Find the total cost of the job.

Lecture Video

Solution Video

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Question 15: Determine the surface area of a square-based pyramidal candle with a base side length of 8 cm and a slant height of 10 cm.

Lecture Video

<

Solution Video

Question 16: Calculate the volume and surface area of each figure.

Lecture Video

Solution Video

<

Question 17: Gum is packaged in a square-based pyramid- shaped box with a distance of 6 cm from the centre of the base to the sides and a height of 12 cm.

a) How much material was used to create the box?

b) What is the volume of the box?

Lecture Video

Solution Video

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Question 18: Determine the height of a square-based pyramid with a base side length of 8.0 cm and a surface area of 440.0 cm^2.

Lecture Video

Solution Video

<

Question 19: Calculate the volume and surface area of each figure.

Lecture Video <

Solution Video

Question 20: A solid figure is said to be truncated when a portion of the bottom is cut and removed. The cut line must be parallel to the base. Many paper cups, such as the one shown here, are truncated cones. Calculate the volume of this paper cup.

Lecture Video <

Solution Video

Question 21: Calculate the volume and surface area of this sphere.

Lecture Video <

Solution Video

Question 22: A spherical bar of soap just fits inside its package, which is a cube with a side length of 8 cm.

a) What is the volume of the bar of soap.

b) Calculate the amount of empty space in the box.

Lecture Video

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Solution Video

Chapter Test Measurement

Ch7-8 Cumulative Review of Geometry

In which diagram is $x = 150^\circ$?

Question 1:

Lecture Video <

Solution Video

Question 2:

Lecture Video <

Solution Video

Question 3: Determine the length of the red line segment.

A. 60 cm

B. 35 cm

C. 30 cm

D. 16 cm

Lecture Video

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Solution Video

Question 4:

Lecture Video

Solution Video

<

Question 5:

Lecture Video

Solution Video

<

Question 6:

Lecture Video

Solution Video

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Question 7:

What is the greatest rectangular area that can be enclosed with a 100 m roll of fencing?

A. $100\ m^2$ **C.** $625\ m^2$

B. $250\ m^2$ **D.** $825\ m^2$

Lecture Video <

Solution Video

Question 8:

Lecture Video <

Solution Video

Question 9:

Lecture Video <

Solution Video

Question 10:

Lecture Video

<

Solution Video

Chapter 9 Appendix Topics

Powers

Question 1: Write the product represented by each power. Then, evaluate the expression.

2^2

Lecture Video

Solution Video

<

Question 2: Write the product represented by each power. Then, evaluate the expression.

2^3

Lecture Video

Solution Video

<

Question 3: Write the product represented by each power. Then, evaluate the expression.

2^4

Lecture Video

Solution Video

<

Question 4: Write the product represented by each power. Then, evaluate the expression.

3^2

Lecture Video

Solution Video

<

Question 5: Write the product represented by each power. Then, evaluate the expression.

10^3

Lecture Video

Solution Video

<

Question 6: Write the product represented by each power. Then, evaluate the expression.

10^4

Lecture Video

Solution Video

<

Question 7: Write the product represented by each power. Then, evaluate the expression.

4^2

Lecture Video

Solution Video

<

Question 8: Write the product represented by each power. Then, evaluate the expression.

4^3

Lecture Video

Solution Video

<

Question 9: Write the product represented by each power. Then, evaluate the expression.

5^3

Lecture Video

Solution Video

<

Question 10: Write the product represented by each power. Then, evaluate the expression.

5^5

Lecture Video

<

Solution Video

Order of Operations

Question 1: Evaluate using the rules for order of operations.

$(3 + 6 \div 3)^2$

Lecture Video <

Solution Video

Question 2: Evaluate using the rules for order of operations.

$4\left(2^3 - 3 \times 2\right)$

Lecture Video <

Solution Video

Question 3: Evaluate using the rules for order of operations.

$2\left(3^2 + 1\right) \div 5$

Lecture Video <

Solution Video

Question 4: Evaluate using the rules for order of operations.

$(9+1)^3 \div \left(3^2+1\right)$

Lecture Video <

Solution Video

Question 5: Evaluate using the rules for order of operations.

$[(8+6 \div 3)-5]^2$

Lecture Video <

Solution Video

Question 6: Evaluate using the rules for order of operations.

$4\left[\left(32-5^2\right)-\left(2^3-1\right)\right]$

Lecture Video <

Solution Video

Sum of Integers

Question 1: Represent each operation using integer counters or a number line.

$-6 + (-3)$

Lecture Video <

Solution Video

Question 2: Represent each operation using integer counters or a number line.

$5 + (-2)$

Lecture Video <

Solution Video

Question 3: Represent each operation using integer counters or a number line.

$-23 + 8$

Lecture Video <

Solution Video

Question 4: Determine each sum.

$-3 + (-2)$

Lecture Video <

Solution Video

Question 5: Determine each sum.

$2 + (-3)$

Lecture Video <

Solution Video

Question 6: Determine each sum.

$-40 + (-15)$

Lecture Video <

Solution Video

Question 7: Calculate.

$3 - (-4) + 10$

Lecture Video <

Solution Video

Question 8: Calculate.

$-7 + 2 - (-1)$

Lecture Video <

Solution Video

Question 9: Calculate.

$-5 - (-3) + 4$

Lecture Video <

Solution Video

Question 10: Calculate.

$-41 + (-32) + 15$

Lecture Video <

Solution Video

Question 11: Represent each operation using integer counters or a number line.

$5 - (-4)$

Lecture Video <

Solution Video

Question 12: Determine each difference.

$4 - (-3)$

Lecture Video <

Solution Video

Question 13: Determine each difference.

$-5-(-2)$

Lecture Video

Solution Video

<

Question 14: Determine each difference.

$5-(-13)$

Lecture Video

Solution Video

<

Question 15: Determine each difference.

$-14-(-7)$

Lecture Video

Solution Video

<

Question 16: Determine each difference.

$6 - (-6)$

Lecture Video

Solution Video

<

Question 17: Represent each operation using integer counters or a number line.

$-20 - 16$

Lecture Video

Solution Video

<

Question 18: Represent each operation using integer counters or a number line.

$-9 - 6$

Lecture Video

Solution Video

<

Question 19: Determine each sum.

$-18 + 8$

Lecture Video <

Solution Video

Question 20: Determine each sum.

$-6 + 4$

Lecture Video <

Solution Video

Question 21: Determine each difference.

$-43 - 4$

Lecture Video <

Solution Video

Question 22: Determine each sum.

$32 + (-46)$

Lecture Video

<

Solution Video

Product of Integers

Question 1: Represent each operation using integer counters or a number line.

-2×5

Lecture Video

Solution Video

Question 2: Represent each operation using integer counters or a number line.

$-5 \times (-4)$

Lecture Video

Solution Video

Question 3: Calculate each quotient.

$-30 \div (-15)$

Lecture Video

Solution Video

Question 4: Evaluate.

$(-5)(-5)$

Lecture Video <

Solution Video

Question 5: Evaluate.

$-56 \div 8$

Lecture Video <

Solution Video

Question 6: Represent each operation using integer counters or a number line.

$3 \times (-6)$

Lecture Video <

Solution Video

Question 7: Calculate the product.

(-3)(2)

Lecture Video

Solution Video

<

Question 8: Calculate the product.

(4)(-3)

Lecture Video

Solution Video

<

Question 9: Calculate the product.

(-2)(7)

Lecture Video

Solution Video

<

Question 10: Represent each operation using integer counters or a number line.

$-6 \times (-9)$

Lecture Video <

Solution Video

Question 11: Calculate the product.

(-4)(-9)

Lecture Video <

Solution Video

Question 12: Calculate the product.

(-7)(-3)

Lecture Video <

Solution Video

Question 13: Calculate the product.

(5)(4)

Lecture Video

Solution Video

<

Question 14: Evaluate.

$(-2)(5)(-4)$

Lecture Video

Solution Video

<

Question 15: Evaluate.

$(8)(4) \div (-2)$

Lecture Video

Solution Video

<

Question 16: Evaluate.

$(4)(81) \div (-27)(-2)$

Lecture Video

<

Solution Video

Question 17: Evaluate.

$64 \div [(-4)(-4)(-4)]$

Lecture Video

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Solution Video

Operations with Integers

Sum and Difference of Fractions

Question 1: Represent each operation using a grid, fraction strips, or a number line.

$$\frac{3}{4} + \frac{1}{5}$$

Lecture Video <

Solution Video

Question 2: Evaluate.

$$\frac{3}{4} + \frac{3}{10}$$

Lecture Video <

Solution Video

Question 3: Evaluate.

$$\frac{2}{5} + \frac{6}{7}$$

Lecture Video <

Solution Video

Question 4: Evaluate.

$$\frac{7}{2} + \frac{3}{5}$$

Lecture Video <

Solution Video

Question 5: Represent each operation using a grid, fraction strips, or a number line.

$$\frac{2}{9} + \frac{5}{9}$$

Lecture Video <

Solution Video

Question 6: Represent each operation using a grid, fraction strips, or a number line.

$$\frac{3}{8} + \frac{1}{8}$$

Lecture Video <

Solution Video

Question 7: Add.

$$\frac{1}{7} + \frac{3}{7}$$

Lecture Video

Solution Video

<

Question 8: Add.

$$\frac{2}{9} + \frac{5}{9}$$

Lecture Video

Solution Video

<

Question 9: Add.

$$\frac{3}{8} + \frac{1}{8}$$

Lecture Video

Solution Video

<

Question 10: Represent each operation using a grid, fraction strips, or a number line.

$$\frac{1}{3} + \frac{1}{9}$$

Lecture Video <

Solution Video

Question 11: Add.

$$\frac{1}{3} + \frac{1}{9}$$

Lecture Video <

Solution Video

Question 12: Add.

$$\frac{1}{3} + \frac{1}{6}$$

Lecture Video <

Solution Video

Question 13: Add.

$$\frac{1}{3} + \frac{5}{12}$$

Lecture Video <

Solution Video

Question 14: Subtract.

$$\frac{7}{15} - \frac{2}{5}$$

Lecture Video <

Solution Video

Question 15: Subtract.

$$\frac{1}{3} - \frac{1}{6}$$

Lecture Video <

Solution Video

Question 16: Subtract.

$\frac{5}{9} - \frac{1}{9}$

Lecture Video

Solution Video

<

Question 17: Subtract.

$$\frac{14}{15} - \frac{7}{15}$$

Lecture Video

Solution Video

<

Question 18: Subtract.

$$\frac{5}{6} - \frac{3}{8}$$

Lecture Video

Solution Video

<

Question 19: Subtract.

$$\frac{3}{4} - \frac{1}{6}$$

Lecture Video <

Solution Video

Question 20: Evaluate.

$$\frac{4}{3} - \frac{2}{11}$$

Lecture Video <

Solution Video

Question 21: Evaluate.

$$\frac{8}{15} - \frac{1}{16}$$

Lecture Video <

Solution Video

Question 22: Evaluate.

$$\frac{14}{5} - \frac{5}{7}$$

Lecture Video

<

Solution Video

Operations with Fractions

Product of Decimals

9.16 Angles

Question 1: Find the measure of each unknown angle.

Lecture Video

Solution Video

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Question 2: Find the measure of each unknown angle.

Lecture Video

Solution Video

<

Question 3: Find the measure of each unknown angle.

Lecture Video

Solution Video

<

Question 4: Find each missing measure.

Lecture Video

<

Solution Video

Question 5: Find the measure of each unknown angle.

Lecture Video

<

Solution Video

Question 6: Find the measure of each unknown angle.

Lecture Video

<

Solution Video

Question 7: Find each missing measure.

Lecture Video

Solution Video

<

Question 8: Find each missing measure.

Lecture Video

Solution Video

<

Question 9: Find the measure of each unknown angle.

Lecture Video

Solution Video

<

Question 10: Find the measure of each unknown angle.

Lecture Video

Solution Video

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Question 11: Find the measure of each unknown angle.

Lecture Video

Solution Video

<

Question 12: Find each missing measure.

Lecture Video

Solution Video

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Expanded Form and Scientific Notation

Patterns and Relationships

The Cartesian Coordinate System

Equations

Question 1: Solve.

n+3 = 7

Lecture Video

Solution Video

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Question 2: Solve.

n + 3 = 7

Lecture Video

Solution Video

<

Question 3: Solve.

9= 3+x

Lecture Video

Solution Video

<

Question 4: Solve.

9+g =3

Lecture Video

Solution Video

<

Question 5: Solve.

n-4= 7

Lecture Video

Solution Video

<

Question 6: Solve.

z- 2 =13

Lecture Video

Solution Video

<

Question 7: Solve.

$2x = 6$

Lecture Video <

Solution Video

Question 8: Solve.

$3n = 18$

Lecture Video <

Solution Video

Question 9: Solve.

$4c = -16$

Lecture Video <

Solution Video

Question 10: Solve.

$-4m = 20$

Lecture Video

Solution Video

<

Question 11: Solve.

$-30 = 6h$

Lecture Video

Solution Video

<

Question 12: Solve.

$-25 = -5a$

Lecture Video

Solution Video

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Ratio and Rates