

# Math 120, Review Problems for the Final Exam.

This review consists of 99 problems from the main textbook and the pre-algebra handout for the section on Percents (P7)

Contents for the Final Exam:

Chapter 1  
(sections 1, 2, 3, 4, 5, 6 and 7),  
Chapter 2  
(sections 1, 2, 3 and 4),  
Chapter 3  
(sections 1 and 2),  
Chapter 4  
(sections 1, 2, 4, 5 and 6),  
Chapter 5  
(sections 1 and 2),  
Chapter 6  
(sections 1, 2 and 3),  
Chapter 7  
(sections 1, 2, 3, 4 and 5),  
Chapter 8  
(sections 2, 3, and 4).  
Percents  
(Pre-algebra handout P7.2 and P7.4)

1	1.1.39	17	Quick Check 1.6.31
2	1.1.45		
3	1.1.65	18	1.6.57
		19	1.7.39
4	1.2.39	20	1.7.43
		21	1.7.45
5	1.2.51	22	2.1.29
6	1.2.81	23	2.1.33
7	Quick Check 1.3.9	24	2.1.41
8	Quick Check 1.3.15	25	2.2.57
9	1.3.39	26	2.2.63
10	1.4.35	27	2.2.69
		28	2.3.19
11	1.4.71	29	2.3.25
12	1.4.79	30	2.3.35
13	Quick Check 1.5.15	31	2.4.23
14	1.5.49	32	2.4.47
		33	2.4.65
15	1.5.59	34	3.1.23
16	Quick Check 1.6.25		
		35	3.1.31
		36	3.1.39
		37	3.2.13

38	3.2.41	60	5.2.65	76	7.3.13	95	+ Percents 02.6-algorithmic
39	3.2.43					96	+ Percents 03-algorithmic
40	4.1.41			77	7.3.37	97	+ Percents 04-woalgorithmic
		61	6.1.43			98	+ Percents 05-woalgorithmic
		62	6.1.57	78	7.3.59	99	+ Percents 06-woalgorithmic
41	4.1.69			79	7.4.17		
42	4.1.85	63	6.1.61				
43	4.2.63			80	7.4.43		
		64	6.2.23				
44	4.2.107						
45	4.2.119			81	7.4.77		
46	4.4.29	65	6.2.31				
47	4.4.37			82	7.5.37		
48	4.4.59	66	6.2.45				
49	4.5.33			83	7.5.73		
50	4.5.49	67	6.3.29				
51	4.5.87	68	6.3.49	84	7.5.75		
				85	8.2.23		
52	4.6.21	69	6.3.95				
				86	8.2.67		
53	4.6.33	70	7.1.21	87	8.2.85		
54	4.6.39			88	8.3.23		
		71	7.1.53				
55	5.1.21			89	8.3.41		
		72	7.1.59				
56	5.1.33			90	8.3.89		
57	5.1.57	73	7.2.23	91	8.4.27		
58	5.2.19						
		74	7.2.53	92	8.4.59		
59	5.2.37	75	7.2.81	93	8.4.83		
				94	+ Percents 01		

Review problems like these can be found as a Homework in MyMathLab: **Review for the Final Exam.**

It can also be found as a practice test in MyMathLab (20 random questions chosen): **Practice for the Final Exam.**

Finally, in the pages that follow you can find the selected problems to print and work with them on paper. The answers are at the end.

*Remember, in the Final Exam, you must show all your work to get credit.*

1. Solve the following equation  $5x + 2 = 17$   
Select the correct choice below
- ☐ A. The solution set is {                      }.  
(an integer or a simplified fraction.)
- ☐ B. The solution is all real numbers.
- ☐ C. The solution is the empty set.
2. Solve the following linear equation  $6m + 1 = 5m - 2$   
Select the correct choice below

- ☐ A. The solution set is {                      }.  
(an integer or a simplified fraction.)
- ☐ B. The solution is all real numbers.
- ☐ C. The solution is the empty set.

3. Solve the following linear equation. Identify the equation as an identity, contradiction, or conditional equation  $\frac{x}{4} + \frac{7x}{6} = -\frac{85}{12}$   
Select the correct choice below

- ☐ A. The solution set is {                      }.  
(an integer or a simplified fraction.)
- ☐ B. The solution is all real numbers.
- ☐ C. The solution is the empty set.

State whether the equation is an identity, contradiction, or conditional equation.

- ☐ Identity
- ☐ Contradiction
- ☐ Conditional equation

4. Translate into a mathematical statement. Then solve the equation.  
Five times a number  $x$   
is equivalent to  
the sum of two times  $x$  and 6.  
Translate.

- ☐ A.  $5x = 2x + 6$
- ☐ B.  $5x + 2x + 6$
- ☐ C.  $5x = 2x + 6x$
- ☐ D.  $5x = 2(x + 6)$

Solve the equation found above.

$x =$

5. An inheritance of \$2,400,000 is to be divided among Scott, Alice, and Tricia in the following manner:  
Alice is to receive  $\frac{11}{12}$  of what Scott gets,  
while Tricia gets  $\frac{1}{12}$  of what Scott gets.  
How much does each receive?

Scott gets \$ .

Alice gets \$ .

Tricia gets \$ .

6. Two boats leave a port at the same time, one traveling north and the other traveling south. The northbound boat travels at 12 miles per hour (mph) faster than the southbound boat.  
If the southbound boat is traveling at 21 mph, how long before they are 135 miles apart?  
The boats will be 135 miles apart after  hours.  
(an integer or a decimal.)

7.

The perimeter  $P$  of a parallelogram is given by the formula  $P = 2a + 2b$ , where  $a$  is the length of one side of the parallelogram and  $b$  is the length of the adjacent side.

a. Solve the formula for  $b$ .

b. Find the length of one side of a parallelogram whose perimeter is 100 cm and whose adjacent length is 30 cm.

a.  $b =$

(Use integers or fractions for any numbers in the expression. Simplify your answer.)

b. The length of the side of the parallelogram which is not given is  cm.

8.

The opening of a rectangular bookcase has a perimeter of 280 inches. If the height of the bookcase is 34 inches more than the width, determine the dimensions of the opening of the bookcase.

What is the width?  inches

What is the height?  inches

9.

Solve for  $y$

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

$y =$   (Simplify your answer.)

10.

Write the inequality using interval notation and illustrate the inequality using the real number line.

$$x \geq -8$$

Choose the correct interval notation below that represents the inequality.

☐ A.  $[-8, \infty]$

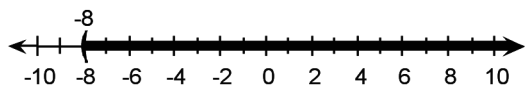
☐ B.  $(-8, \infty)$

☐ C.  $(-8, \infty]$

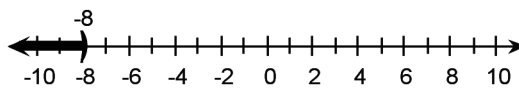
☐ D.  $[-8, \infty)$

Choose the correct real number line below that represents the inequality.

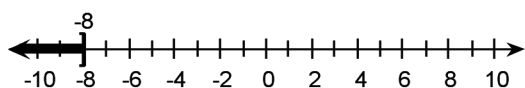
☐ A.



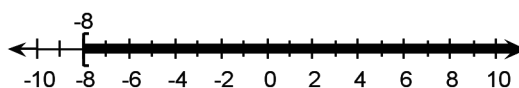
☐ B.



☐ C.



☐ D.



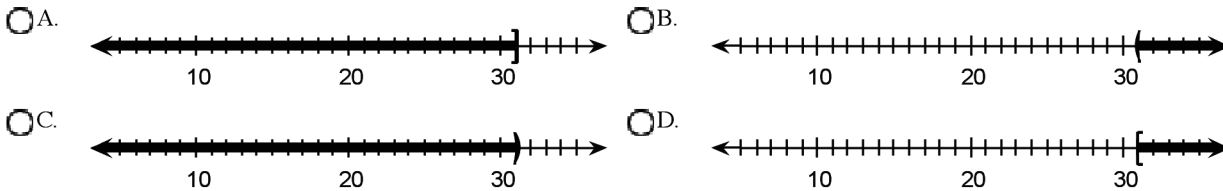
11.

Solve the linear inequality. Express the solution set using set-builder and interval notation. Graph the solution set  $5(x - 3) \geq 4(x + 4)$

The solution set expressed in set-builder notation is  $\{x \mid \boxed{\phantom{000}}\}$ .

The solution set expressed in interval notation is  $\boxed{\phantom{000}}$

Choose the correct graph of the inequality below.



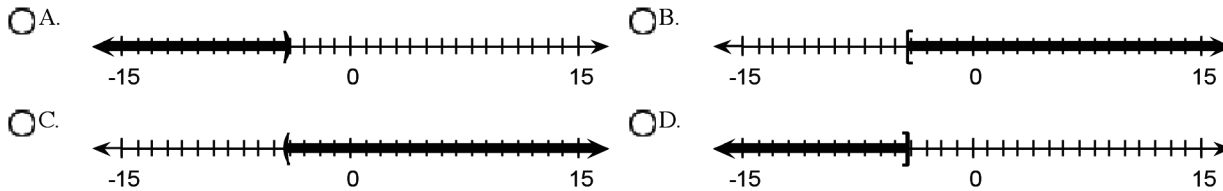
12.

Solve the linear inequality. Express the solution set using set-builder and interval notation. Graph the solution set  $\frac{1}{2}(x - 1) \geq \frac{3}{4}(2x + 5)$

The solution set expressed in set-builder notation is  $\{x \mid \boxed{\phantom{000}}\}$ .

The solution set expressed in interval notation is  $\boxed{\phantom{000}}$

Choose the correct graph of the inequality below.

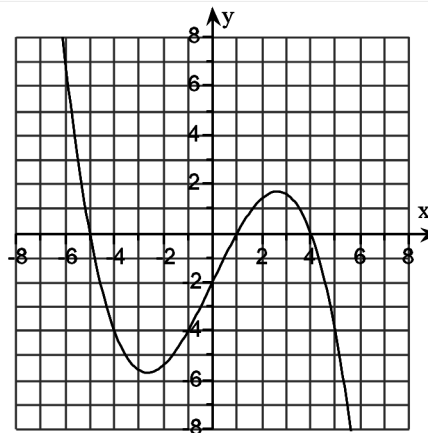


13.

List the intercepts of the graph shown on the right.

The intercept(s) is/are

(Use an ordered pair. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)



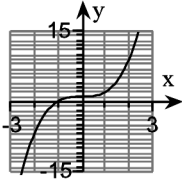
14.

Graph the following equation by plotting points

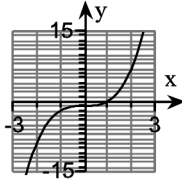
$$y = x^3 + 1$$

Choose the correct graph

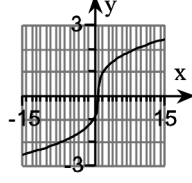
☐ A.



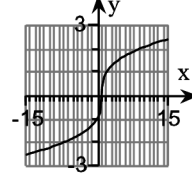
☐ B.



☐ C.



☐ D.



15.

If  $(a, 8)$  is a point on the graph of  $y = 3x - 5$ , what is  $a$ ?  $a = \boxed{\phantom{000}}$  (an integer or a fraction.)

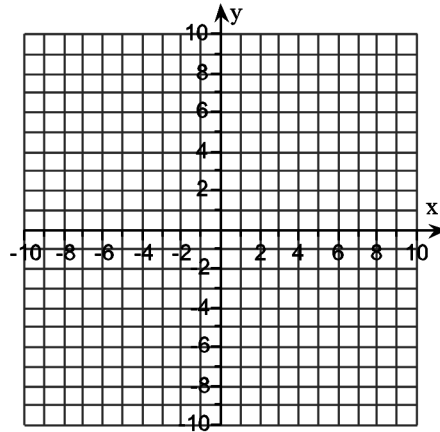
16.

Find an equation of the line with the properties given below. Graph the line.

$$m = 4; (x_1, y_1) = (3, 4)$$

What is an equation for the line?

(your answer in point-slope form. Do not simplify.)



17.

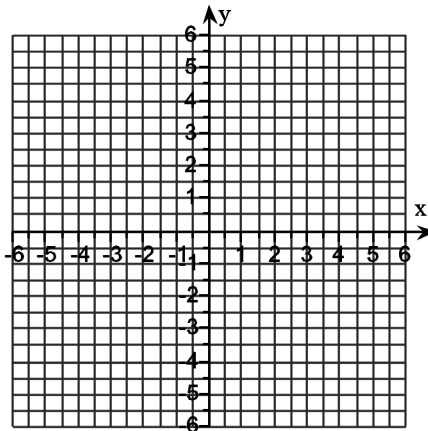
Find the slope and y-intercept of the following line. Graph the line.

$$3x - 2y = 9$$

What is the slope of the line?

(an integer or a simplified fraction.)

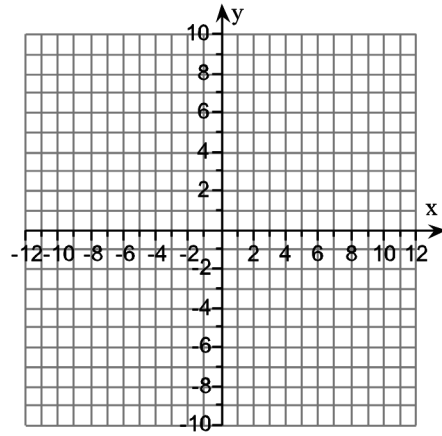
What is the y-intercept of the line?



18.

Graph the linear equation.

$$y = -2$$



19.

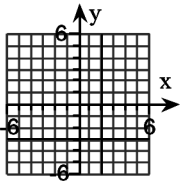
Find an equation of the line perpendicular to  $x = 2$  through the point  $(2, -3)$ . Express your answer in slope-intercept form. Graph the lines.

What is the equation of the perpendicular line?

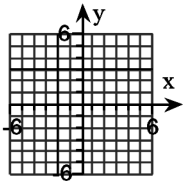
(an equation in slope-intercept form. Simplify your answer. Use integers or fractions for any numbers in the expression.)

Choose the correct graph of the lines.

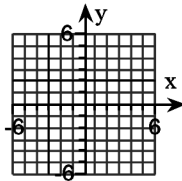
☐ A.



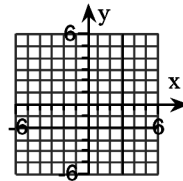
☐ B.



☐ C.



☐ D.



20.

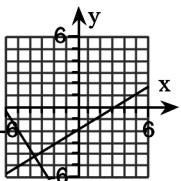
Find an equation of the line perpendicular to  $-5x + 4y + 8 = 0$  through the point  $(-5, -2)$ . Express your answer in slope-intercept form. Graph the lines.

What is the equation of the perpendicular line?

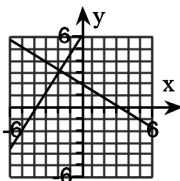
(an equation in slope-intercept form. Simplify your answer. Use integers or fractions for any numbers in the expression.)

Choose the correct graph of the lines.

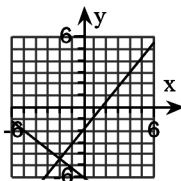
☐ A.



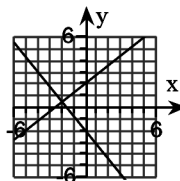
☐ B.



☐ C.



☐ D.



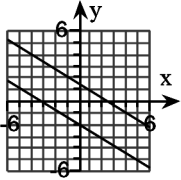
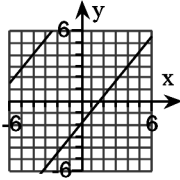
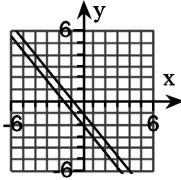
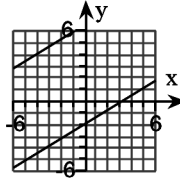
21.

Find an equation of the line parallel to  $-5x - 4y = 8$  through the point  $(-4, 4)$ . Express your answer in slope-intercept form. Graph the lines.

What is the equation of the parallel line?

(an equation in slope-intercept form. Simplify your answer. Use integers or fractions for any numbers in the expression.)

Choose the correct graph of the lines.

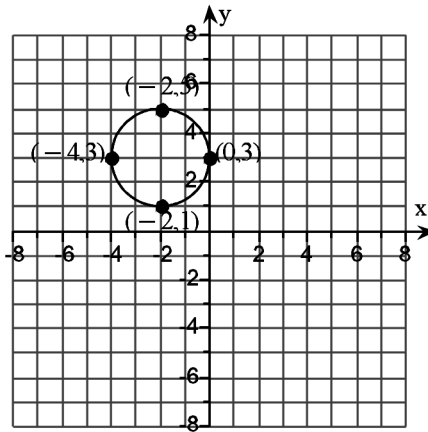
☐ A.

☐ B.

☐ C.

☐ D.


22.

Identify the domain and the range of the relation from the graph.

The domain is  $\{x | \text{ } \boxed{\phantom{000}} \}$ .  
(set notation.)

The range is  $\{y | \text{ } \boxed{\phantom{000}} \}$ .  
(set notation.)

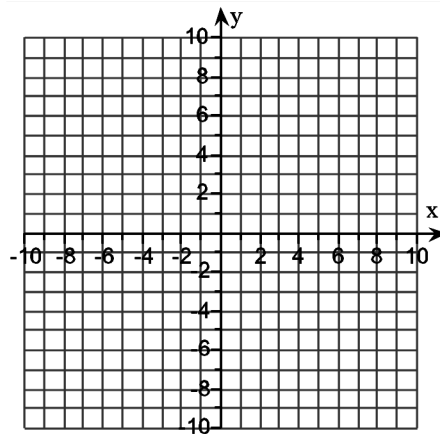


23.

Graph the relation. Use the graph to identify the domain and the range  $y = -5x + 2$

The domain is  $\boxed{\phantom{000}}$   
(interval notation.)

The range is  $\boxed{\phantom{000}}$   
(interval notation.)





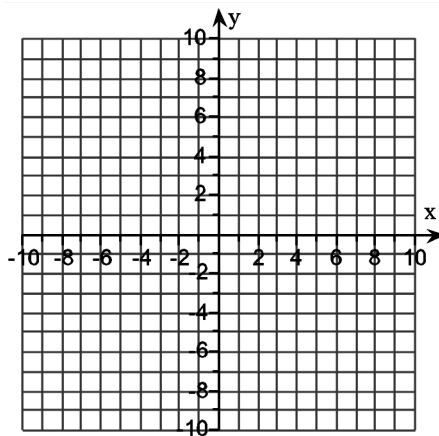
24.

Graph the relation. Use the graph to identify the domain and the range

$$y = 5x^2 - 2$$

The domain is

(interval notation.)



The range is

(interval notation.)

25.

Find the following value for the function.

$$F(z) = \frac{z+7}{z-8}, F(9)$$

$$F(9) = \text{$$

26.

Express the area  $A$  of a circle as a function of its radius,  $r$ . Determine the area of a circle whose radius is 2 inches. That is, find  $A(2)$ .

$$A(r) = \text{} \quad (\text{an exact answer, using } \pi \text{ as needed.})$$

$$A(2) = \text{} \text{ inches}^2 \quad (\text{Round to the nearest hundredth as needed.})$$

27.

The function  $R(p) = -p^2 + 210p$  represents the daily revenue  $R$  earned from selling digital cameras at  $p$  dollars for  $0 \leq p \leq 210$ .

(a) Identify the dependent and independent variable.

(b) Evaluate  $R(90)$ . Provide a verbal explanation of the meaning of  $R(90)$ .

(c) Evaluate  $R(120)$ . Provide a verbal explanation of the meaning of  $R(120)$ .

- (a) Identify the variables. ☐  $R$  is the dependent variable and  $p$  is the independent variable.  
☐  $R$  is the independent variable and  $p$  is the dependent variable.

(b)  $R(90) =$

Choose the correct meaning of this value.

- ☐ A. The value of  $R(90)$  is the revenue in dollars the company will earn per day by selling digital cameras for \$90.
- ☐ B. The value of  $R(90)$  is the revenue in dollars the company will earn for each digital camera when the price is \$90.
- ☐ C. The value of  $R(90)$  is the price of each digital camera when the revenue the company earns is \$90 per day.

(c)  $R(120) =$

Choose the correct meaning of this value.

- ☐ A. The value of  $R(120)$  is the revenue in dollars the company will earn for each digital camera when the price is \$120.
- ☐ B. The value of  $R(120)$  is the price of each digital camera when the revenue the company earns is \$120 per day.
- ☐ C. The value of  $R(120)$  is the revenue in dollars the company will earn per day by selling digital cameras for \$120.

28.

Find the domain of the following function.

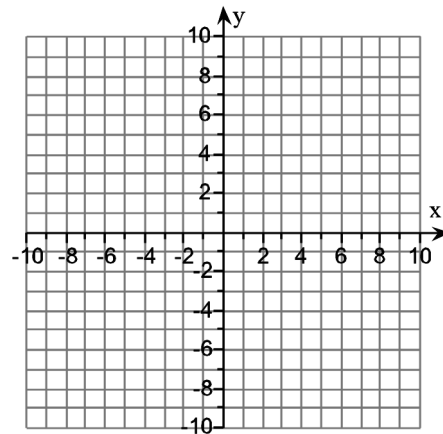
$$f(z) = \frac{3z + 8}{z - 4}$$

Which of the following is the domain of  $f(z)$ ?

- ☐  $\{z | z \text{ is a real number}\}$
- ☐  $\left\{z | z \neq 4 \text{ and } z \neq -\frac{8}{3}\right\}$
- ☐  $\left\{z | z \neq -\frac{8}{3}\right\}$
- ☐  $\{z | z \neq 4\}$

29.

Graph the function  $f(x) = 3x - 5$ .



30.

For the graph of the function complete parts (a) through (c).

- (a) Find the domain and the range.  
 (b) Find the intercepts, if any.  
 (c) Find the zeros, if any.

(a) The domain is   
 (answer in interval notation.)

The range is   
 (answer in interval notation.)

(b) Find the x-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

☐ A. The x-intercept(s) is(are)

(Use a comma to separate answers as needed.)

☐ B. There is no x-intercept.

Find the y-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

☐ A. The y-intercept(s) is(are)

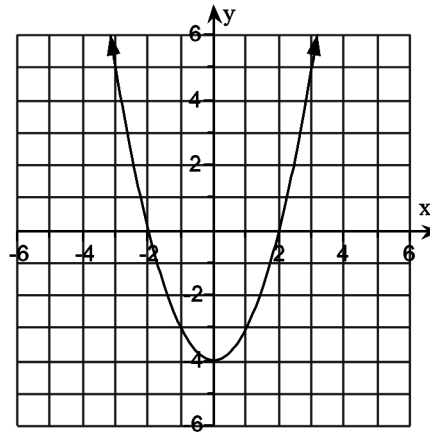
(Use a comma to separate answers as needed.)

☐ B. There is no y-intercept.

☐ B. There is no y-intercept.

(c) What are the zeros of the function, if any?

- ☐ 2  
☐ -2  
☐ -2 and 2  
☐ No zeros

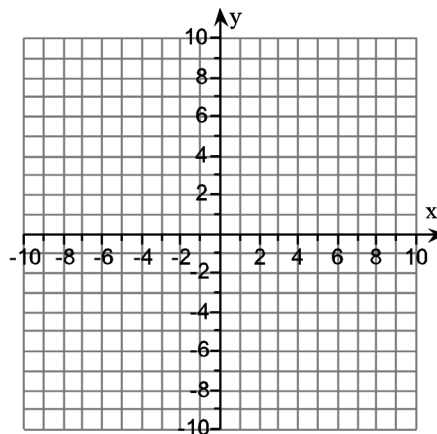


31.

Graph the linear function.

$$f(x) = -7$$

Graph the function.



32.

Suppose that  $f(x) = 5x + 3$ .

- (a) What is the slope?  
 (b) What is the y-intercept?  
 (c) What is the zero of  $f$ ?  
 (d) Solve  $f(x) = 8$ . What point is on the graph of  $f$ ?

(e) Solve  $f(x) \leq -2$ . (f) Graph  $f$ .

(a) The slope is

(b) The y-intercept is

(c) The zero of  $f$  is

(d) Solve  $f(x) = 8$ . The solution is

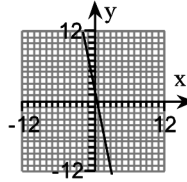
The point on the graph is   
 (an ordered pair.)

(e) Write the solution of  $f(x) \leq -2$ . The solution is  (answer in interval notation.)

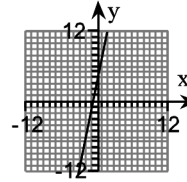
(f) Graph the function.

Choose the correct graph below.

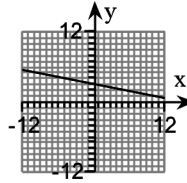
☐ A.



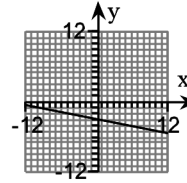
☐ B.



☐ C.



☐ D.



33.

**Straight-line Depreciation** Suppose that a company has just purchased a new computer for \$2800. The company chooses to depreciate using the straight-line method for 4 years.

(a) Write a linear function that expresses the book value of the computer as a function of its age.

$V(x) =$

(your answer in slope-intercept form. Use integers or fractions for any numbers in the expression.)

(b) graph the linear equation.

(c) What is the book value of the computer after 3 years?

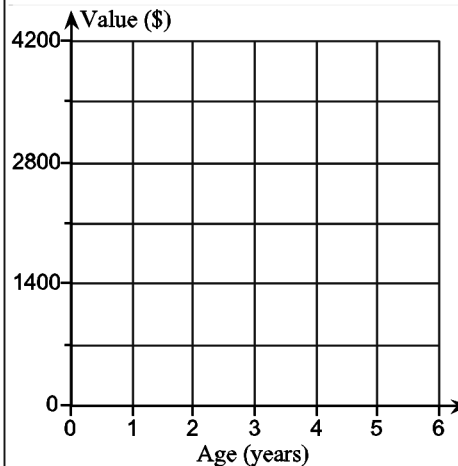
\$

(Round to the nearest dollar as needed.)

(d) When will the computer be worth \$2100?

After  year(s)

(Type a whole number.)



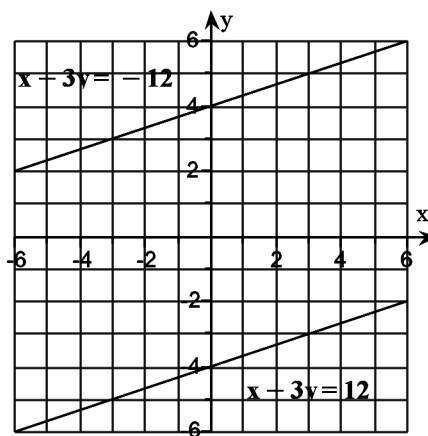
34.

Use the graph of the system to determine whether the system is consistent or inconsistent. If consistent, indicate whether the system is independent or dependent.

$$\begin{cases} x - 3y = -12 \\ x - 3y = 12 \end{cases}$$

Choose the correct answer below.

- ☐ consistent and dependent
- ☐ inconsistent
- ☐ consistent and independent



35.

Solve the system of equations using substitution.

$$\begin{cases} x = \frac{1}{5}y & (1) \\ 4x - y = -1 & (2) \end{cases}$$

The solution is

(an ordered pair, integer or a simplified fraction.)

36.

Solve the system of equations using elimination.

$$\begin{cases} x + 5y = -3 \\ 3x + 6y = 0 \end{cases}$$

What is the solution? Select the correct choice below and fill in any answer boxes in your choice.

- ☐ A.  (an ordered pair.)
- ☐ B. There are infinitely many solutions.
- ☐ C. There is no solution.

37.

Gina rented a moon-walk for 5 hours at a total cost of \$185. Lori rented the same moon-walk for 3 hours at a total cost of \$135. The cost of renting is based upon a flat set-up fee plus a rental rate per hour. How much is the set-up fee? What is the hourly rental fee?

The set-up fee is \$

The hourly rental fee is \$

38.

Suppose that Kristin placed an order for five hamburgers and two sodas, for a total of 1868 calories. Jake placed an order for three hamburgers and five sodas, for a total of 1953 calories. How many calories are in a hamburger? How many calories are in a soda?

Each hamburger has  calories.

Each soda has  calories.

39.

A metallurgist has an alloy with 5% titanium and an alloy with 30% titanium. He needs 100 grams of an alloy with 15% titanium. How much of each alloy should be mixed to attain the 100 grams of alloy with 15% titanium?

grams of the alloy with 5% of titanium are needed.

grams of the alloy with 30% of titanium are needed.

40.

Determine whether the expression is a polynomial.  $\frac{1}{y^5} + 3$

Is the expression a polynomial? ☐ No ☐ Yes

41.

Simplify the following polynomial. Express your answer as a single polynomial in standard form.

$$(9x^2y^2 - 14x^2y + 2xy^2) + (2x^2y^2 + 3x^2y - 4xy^2) = \boxed{\phantom{000000}}$$

(Simplify your answer.)

42.

Add  $4x^3 - 4x + 5$  to  $-3x^3 + x^2 - 3x + 7$ .

$$(4x^3 - 4x + 5) + (-3x^3 + x^2 - 3x + 7) =$$

$$= \boxed{\phantom{000000}}$$

(Simplify your answer.)

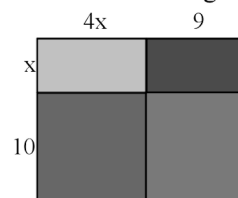
Simplify the expression.

$$\left(8x + \frac{1}{8}\right)^2 = \boxed{\phantom{000000}}$$

(Use integers or fractions for any numbers in the expression.)

45.

We can visualize the product of polynomials by using area of rectangles. Find a polynomial expression for the total area of the figure.




(Simplify your answer.)

43.

Find the product of the polynomials.

$$(x + y)(8x^2 - 2xy + 5y^2)$$

$$(x + y)(8x^2 - 2xy + 5y^2) =$$

$$= \boxed{\phantom{000000}}$$

(Simplify your answer.)

46.

Factor out the greatest common factor.

$$45m^3n + 55mn^3 - 40m^4n^2 =$$

44.

47.

Factor by grouping.

$$3x + 3y + bx + by =$$

Factor the perfect square trinomial completely.

$$49x^2 + 14x + 1 =$$

48.

Factor and simplify the expression.

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

(your answer in factored form.)

$$=$$

49.

Factor the trinomial completely

$$x^2 - 8x + 15$$

Select the correct choice below and, if necessary, fill in the answer box within your choice

☐ A.  $x^2 - 8x + 15 =$

☐ B. The polynomial is prime.

50.

Factor the given polynomial

$$3x^2 + 4x + 1$$

Select the correct choice below and fill in any answer boxes within your choice.

☐ A.  $3x^2 + 4x + 1 =$

☐ B. The polynomial is prime.

51.

Factor the trinomial completely.

If the polynomial cannot be factored, say it is prime

$$-3r^2 - 12r - 9$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☐ A.  $-3r^2 - 12r - 9 =$

(answer in factored form.)

☐ B. The trinomial  $-3r^2 - 12r - 9$  is prime.

52.

53.

Factor the following perfect square trinomial completely.

$$12a^2 - 36ab + 27b^2 =$$

54.

Factor the difference of two squares completely.

$$1 - y^2 =$$

55.

State the domain of the rational expression.

$$\frac{p^2 - 4}{2p^2 + p - 10} \quad \text{What is the domain?}$$

☐ A.  $\{p | p \neq -\frac{5}{2}, p \neq 2, p \neq -2\}$

☐ B.  $\{p | p \neq 2, p \neq -2\}$

☐ C.  $\{p | p \neq -\frac{5}{2}\}$

☐ D.  $\{p | p \neq -\frac{5}{2}, p \neq 2\}$

☐ E.  $\{p | p \text{ is any real number}\}$

56.

Simplify the rational expression.

$$\frac{q^2 + 7q - 18}{q^2 + 16q + 63} =$$

57.

Multiply the rational expression.  
Simplify the product, if possible.

$$\frac{m^2 - n^2}{2m - 2n} \cdot \frac{64m + 16n}{4m^2 + 5mn + n^2}$$

=

58. Perform the indicated operation and simplify the result.

$$\frac{2x^2 - 6x + 34}{x^2 + 2x - 48} - \frac{x^2 + 8x - 14}{x^2 + 2x - 48}$$

=

(Simplify your answer in factored form.)

59. Subtract and simplify the result.

$$\frac{5}{6a^2b} - \frac{7}{24ab^2}$$

=

60. Perform the indicated operation and simplify the result.

$$6 + \frac{x - 6}{x + 6}$$

=

(Simplify your answer in factored form.)

61.

Simplify the radical  $-\sqrt[3]{-64}$

Select the correct choice below and fill in any answer boxes in your choice.

☐ A.  $-\sqrt[3]{-64} =$

(Simplify your answer.)

☐ B. The root is not a real number.

62. Write the expression as a radical and simplify, if possible.

$$49^{1/2} =$$

(Simplify your answer.)

63. Evaluate the expression, if possible.

$$9^{1/2} =$$

64. Simplify the expression.

$$\frac{x^{1/4}}{x^{5/7}} =$$

(Use positive exponents only.

Use integers or fractions for any numbers in the expression.)

65. Simplify the expression.

$$(x^{-7/8} \cdot y) \cdot (x^{6/5} \cdot y^{-7/6}) =$$

=

(Use positive exponents only.

Use integers or fractions for any numbers in the expression.)

66.



Use rational exponents to simplify the radical.

Assume the variable is positive  $\frac{\sqrt{x}}{\sqrt[13]{x}}$

The expression is equal to

(Type an exact answer, using radicals as needed.)

67.

Use the product property to multiply.

Assume that all variables can be any real number.

$$\sqrt[3]{11} \cdot \sqrt[3]{77} = \text{[ ]}$$

(an exact answer, using radicals as needed.

Simplify your answer.)

68.

Simplify the radical using the product property.

Assume that all variables can be any real number.

$$\sqrt{63y^4} = \text{[ ]}$$

(Simplify your answer, an exact answer,  
using radicals as needed.)

69.

Simplify each expression. Assume  
that all variables are greater than zero.

$$\sqrt[3]{\frac{-27x^9}{64y^{12}}} = \text{[ ]}$$

(Simplify your answer, an exact answer,  
using radicals as needed.)

70.

Solve the equation using the square root property.

$$x^2 = 175$$

The solution set is { [ ] }.

(Simplify your answer, exact answers,  
using radicals as needed.

Use a comma to separate answers as needed.)

71.

Solve the quadratic equation  
by completing the square.

$$x^2 + 8x = -15 \quad \text{What is the solution set?}$$

{ [ ] }.

(Use a comma to separate answers as needed.)

72.

Solve the quadratic equation  
by completing the square.

$$x^2 + 3x - 8 = 0 \quad \text{What is the solution set?}$$

{ [ ] }.

(Simplify your answer; an integer or a fraction.  
Use a comma to separate answers as needed.)

73.

Solve the equation using the quadratic formula.

$$4x^2 - x - 14 = 0 \quad \text{What is the solution set?}$$

{ [ ] }.

(Simplify your answer, using radicals as needed.  
Use integers or fractions for any numbers in the  
expression. Use a comma to separate answers  
as needed.

74.

Solve the equation using the quadratic formula.

$$4x^2 + x = 3 \quad \text{What is the solution set?}$$

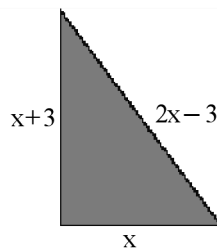
{ [ ] }.

(Simplify your answer, using radicals as needed.  
Use integers or fractions for any numbers in the  
expression. Use a comma to separate answers  
as needed.

75.

Use the Pythagorean Theorem to determine the value of  $x$  for the given measurements of the right triangle.

 $x =$ 



76.

Solve by making a  $u$ -substitution  $x^4 - 37x^2 + 36 = 0$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

☐ A.

The solution set is {  }

(Simplify your answer. Use a comma to separate answers as needed. Type an exact answer, using radicals as needed.)

☐ B.

There is no solution.

77.

Solve by making a  $u$ -substitution  $x^{2/3} - 2x^{1/3} - 8 = 0$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

☐ A.

The solution set is {  }

(Simplify your answer. Use a comma to separate answers as needed. Type an exact answer, using radicals as needed.)

☐ B.

There is no solution.

78.

Solve by making a  $u$ -substitution  $x - 6\sqrt{x} + 5 = 0$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

☐ A.

The solution set is {  }

(Simplify your answer. Use a comma to separate answers as needed. Type an exact answer, using radicals as needed.)

☐ B.

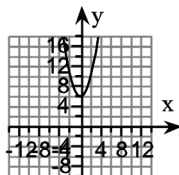
There is no solution.

Use the graph of  $y = x^2$  to graph the quadratic function.

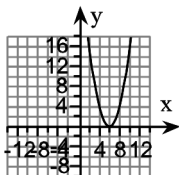
$$f(x) = (x - 6)^2$$

Choose the graph of  $f(x) = (x - 6)^2$  below.

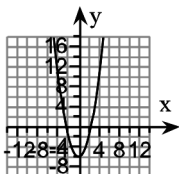
O. A.



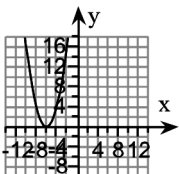
**O**B.



OC.



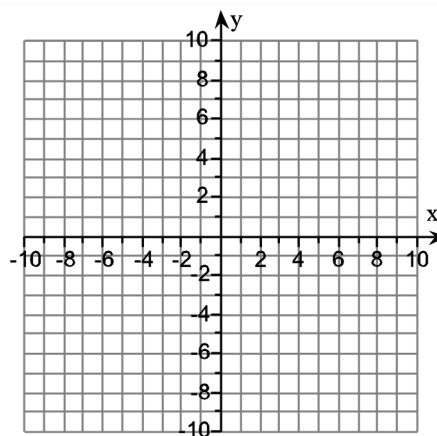
OD.



80.

Use the graph of  $y = x^2$  to graph the quadratic function.

$$f(x) = (x - 1)^2 + 4$$



81.

Write the function in the form  $f(x) = a(x - h)^2 + k$ . Then graph the quadratic function using transformations. Determine the vertex and axis of symmetry. Based on the graph, determine the domain and range of the quadratic function.

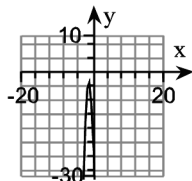
$$f(x) = -12x^2 + 24x - 9$$

Write  $f(x) = -12x^2 + 24x - 9$  in the form  $f(x) = a(x - h)^2 + k$ .

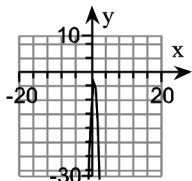
$$f(\mathbf{x}) =$$

Choose the correct graph of  $f(x) = -12x^2 + 24x - 9$  below.

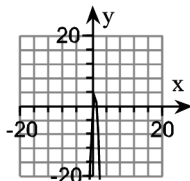
Q. A.



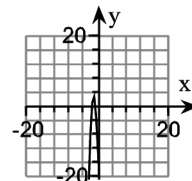
OB.



OC.



OD.



The vertex of  $f(x) = -12x^2 + 24x - 9$  is

(‘an ordered pair.’)

The axis of symmetry is  $x =$

The domain of  $f(x) = -12x^2 + 24x - 9$  is

(answer in interval notation.)

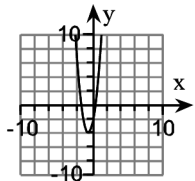
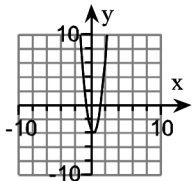
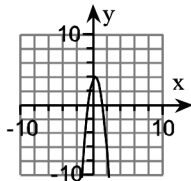
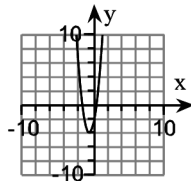
The range of  $f(x) = -12x^2 + 24x - 9$  is

(answer in interval notation.)

82.

Graph the quadratic function using its properties. Based on the graph, determine the domain and range of the quadratic function  $f(x) = 4x^2 - 4x - 3$

Which of the following is the graph of  $f(x) = 4x^2 - 4x - 3$ ?

☐ A.☐ B.☐ C.☐ D.

What is the domain of  $f(x) = 4x^2 - 4x - 3$ ?

The domain of  $f(x)$  is

(answer in interval notation. Use integers or decimals for any numbers in the expression.)

What is the range of  $f(x) = 4x^2 - 4x - 3$ ?

The range of  $f(x)$  is

(answer in interval notation. Use integers or decimals for any numbers in the expression.)

83.

Determine whether the quadratic function has a maximum or minimum value. Then find the maximum or minimum value.

$$f(x) = -7x^2 + 6x + 8$$

What does the given quadratic function have?

☐ minimum

☐ maximum

The minimum or maximum value is  (an integer or a fraction.)

84.

Suppose that the manufacturer of a DVD player has found that, when the unit price is  $p$  dollars, the revenue  $R$  (in dollars) as a function of the price  $p$  is  $R(p) = -2.5p^2 + 800p$ . (a) For what price will the revenue be maximized?

(b) What is the maximum revenue?

(a) The price for which the revenue will be maximized is  $p = \$$

(Simplify your answer.)

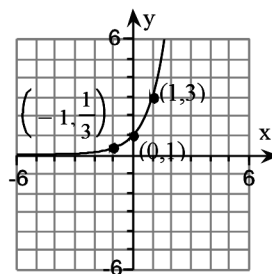
(b) The maximum revenue is  $R = \$$

(Simplify your answer.)

85.

Match the graph to one of the following functions. It may prove useful to create a table of values for each function to assist in identifying the correct function.

- A.  $f(x) = 3^{x+1}$       E.  $f(x) = 3^{-x}$   
 B.  $f(x) = 3^x$       F.  $f(x) = -3^{-x+1}$   
 C.  $f(x) = 3^{x+1} + 2$       G.  $f(x) = -3^x$   
 D.  $f(x) = -3^{-x}$       H.  $f(x) = -3^{x+1}$



Which function is represented by the graph?

(A, B, C, D, E, F, G or H.)

86.

Solve the equation.  $2^{x^2-7} = 64^x$       The solution set is {  }.

(Simplify your answer. Use a comma to separate answers as needed.)

87.

Suppose that  $H(x) = 3 \cdot \left(\frac{1}{2}\right)^x$ .

(a) What is  $H(-4)$ ? What point is on the graph of  $H$ ?

(b) If  $H(x) = \frac{3}{4}$ , what is  $x$ ? What point is on the graph of  $H$ ?

(a)  $H(-4) =$   The point on the graph of  $H$  is  (an ordered pair.)

(b) If  $H(x) = \frac{3}{4}$ ,  $x =$  . The point on the graph of  $H$  is  (an ordered pair.)

88.

Change the exponential equation to an equivalent equation involving a logarithm.

$$16 = 2^4$$

The equivalent logarithmic equation is

(an equation.)

89.

Find the value of the logarithmic expression.

$$\log_{11} 1 = \text{  }$$

90.

Solve the equation  $\log_5(x+10) = 2$

$x =$   (an integer or a decimal.)

91.

Use properties of logarithms to find the exact value of the expression. Do not use a calculator.

$$\log_5 5^6 = \text{  }$$

92. Write the expression as a sum and/or difference of logarithms. Express exponents as factors.

$$\log_2(8\sqrt{z}) = \boxed{\phantom{000}}$$

(an exact answer in simplified form.)

93. Write the expression as a single logarithm.

$$\frac{1}{2} \log_2 x + 2 \log_2 (x - 8) =$$

$$= \boxed{\phantom{000}}$$

(your answer in factored form.)

94. 225% of which whole number is 279?

95. 97 is what percent of 219?

The percent (rounded to **two** decimal places) is:

$$\boxed{\phantom{000}} \%$$

96. What number is 116% of 122?

The number (rounded to 2 decimal places) is:

$$\boxed{\phantom{000}}$$

97. Due to the clousure of an agroindustrial plant, a agricultural town experiences a decrease in population from 30196 to 27100 in the space of one year. For that first year, what was the percent decrease of the population, rounded to the nearest tenth of a percent?

The percent decrease (rounded to the nearest tenth of a percent) was:  $\boxed{\phantom{000}} \%$

98. An employee making a salary of \$2307 per month has his salary increased to \$2334 per month. What was the percent **increase** of this employee's salary, rounded to the nearest tenth of a percent?

The percent **increase** (rounded to the nearest tenth of a percent) is:  $\boxed{\phantom{000}} \%$

99. An electronic piano is marked at \$603, however a sign in the store indicates that the piano is being discounted at 24%. What will be the new selling price of the piano?

The new price (in decimal form rounded to the nearest penny) is:  $\boxed{\phantom{000}} \$$

# ANSWERS

1. A, 3

2. A, -3

3. A, -5  
the third choice

4. A  
2

5. 1,200,000  
1,100,000  
100,000

6. 2.5

7.  $\frac{P-2a}{2}$   
20

8. 53  
87

9.  $16-2x$

10. D  
D

11.  $x \geq 31$   
 $[31, \infty)$   
D

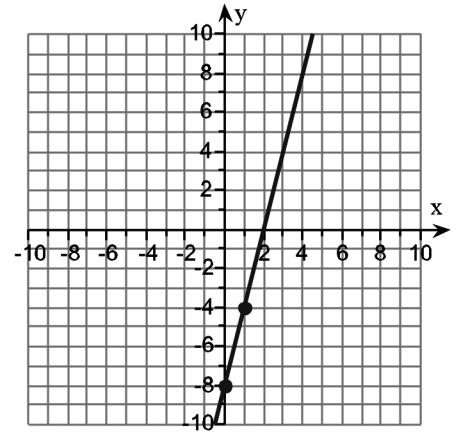
12.  $x \leq -\frac{17}{4}$   
 $\left(-\infty, -\frac{17}{4}\right]$   
D

13.  $(-5,0), (1,0), (4,0), (0,-2)$

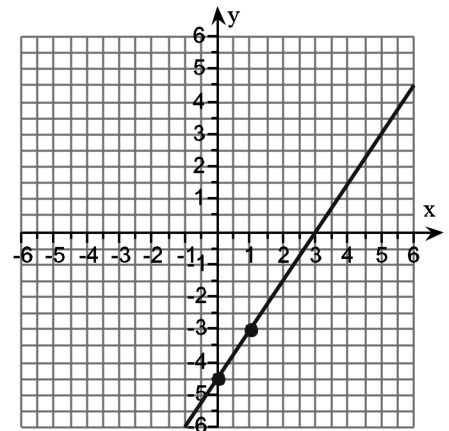
14. A

15.  $\frac{13}{3}$

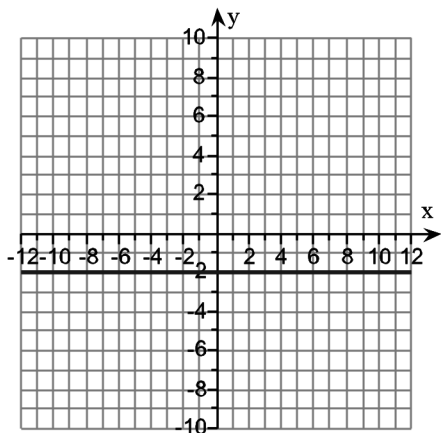
16.  $y-4=4(x-3)$



17.  $\frac{3}{2}$   
 $-\frac{9}{2}$



18.



19.

$$y = -3$$

A

20.

$$y = -\frac{4}{5}x - 6$$

C

21.

$$y = -\frac{5}{4}x - 1$$

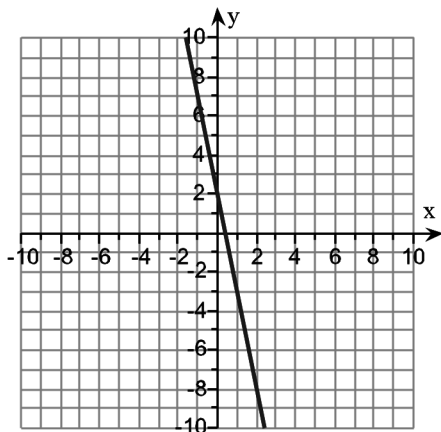
C

22.

$$-4 \leq x \leq 0$$

$$1 \leq y \leq 5$$

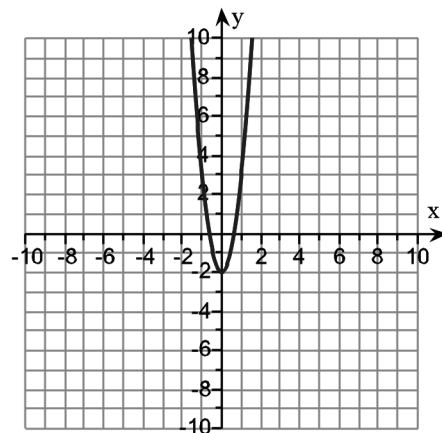
23.



$$(-\infty, \infty)$$

$$(-\infty, \infty)$$

24.



$$(-\infty, \infty)$$

$$[-2, \infty)$$

25.

$$16$$

26.

$$\pi r^2$$

$$12.57$$

27.

the first choice

$$10,800$$

A

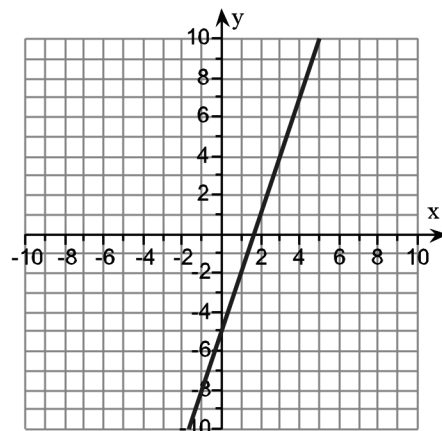
$$10,800$$

C

28.

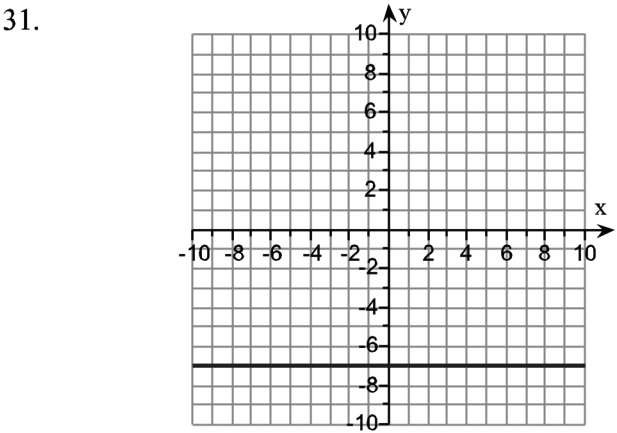
the fourth choice

29.

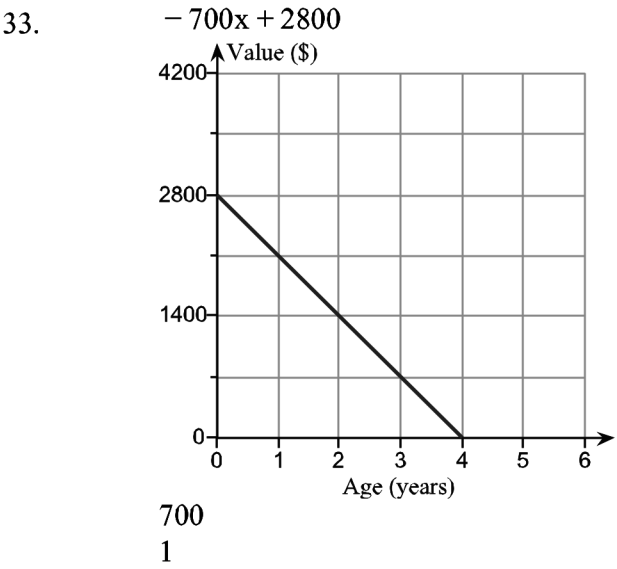




30.  $(-\infty, \infty)$   
 $[-4, \infty)$   
 A,  $-2, 2$   
 A,  $-4$   
 the third choice



32. 5  
 3  
 $-\frac{3}{5}$   
 1  
 $(1, 8)$   
 $(-\infty, -1]$   
 B



34. the second choice

---

35.  $(1, 5)$

---

36. A,  $(2, -1)$

---

37. 60  
 25

---

38. 286  
 219

---

39. 60  
 40

---

40. the first choice

---

41.  $11x^2y^2 - 11x^2y - 2xy^2$

---

42.  $x^3 + x^2 - 7x + 12$

---

43.  $8x^3 + 5y^3 + 6x^2y + 3xy^2$

---

44.  $64x^2 + 2x + \frac{1}{64}$

---

45.  $4x^2 + 49x + 90$

---

46.  $5mn(9m^2 + 11n^2 - 8m^3n)$

---

47.  $(x + y)(3 + b)$

---

48.  $x^2(4x + 3)(28x + 15)$

$$49. \quad A, (x-5)(x-3)$$


---

$$50. \quad A, (3x+1)(x+1)$$


---

$$51. \quad A, -3(r+3)(r+1)$$


---

$$52. \quad (7x+1)^2$$


---

$$53. \quad 3(2a-3b)^2$$


---

$$54. \quad (1-y)(1+y)$$


---

$$55. \quad D$$


---

$$56. \quad \frac{q-2}{q+7}$$


---

$$57. \quad 8$$


---

$$58. \quad \frac{x-8}{x+8}$$


---

$$59. \quad \frac{20b-7a}{24a^2b^2}$$


---

$$60. \quad \frac{7x+30}{x+6}$$


---

$$61. \quad A, 4$$


---

$$62. \quad 7$$


---

$$63. \quad 3$$


---

$$64. \quad \frac{1}{x^{13/28}}$$


---

$$65. \quad \frac{x^{13/40}}{y^{1/6}}$$


---

$$66. \quad \sqrt[26]{x^{11}}$$


---

$$67. \quad \sqrt[3]{847}$$


---

$$68. \quad 3y^2\sqrt{7}$$


---

$$69. \quad -\frac{3x^3}{4y^4}$$


---

$$70. \quad 5\sqrt{7}, -5\sqrt{7}$$


---

$$71. \quad -3, -5$$


---

$$72. \quad -\frac{3}{2} + \frac{\sqrt{41}}{2}, -\frac{3}{2} - \frac{\sqrt{41}}{2}$$


---

$$73. \quad -\frac{7}{4}, 2$$


---

$$74. \quad \frac{3}{4}, -1$$


---

$$75. \quad 9$$


---

$$76. \quad A, 6, -6, 1, -1$$


---

$$77. \quad A, 64, -8$$

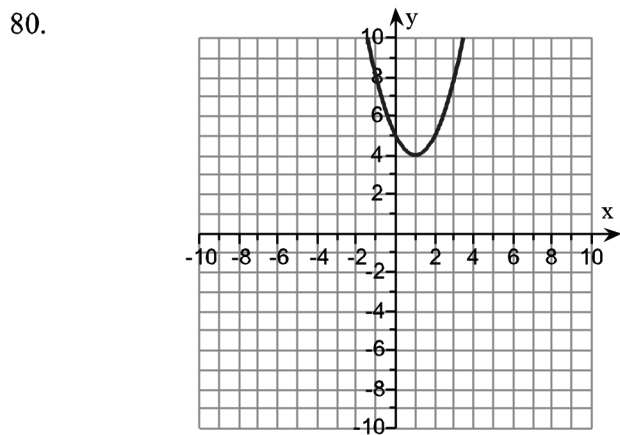

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78. A, 1,25

---

79. B

---



---

81.  $-12(x-1)^2 + 3$   
C  
(1,3)  
1  
 $(-\infty, \infty)$   
 $(-\infty, 3]$

---

82. B  
 $(-\infty, \infty)$   
 $[-4, \infty)$

---

83. the second choice  
 $\frac{65}{7}$

---

84. 160.00  
64,000.00

---

85. B

---

86. -1,7

87. 48  
 $(-4, 48)$   
2  
 $\left(2, \frac{3}{4}\right)$

---

88.  $4 = \log_2 16$

---

89. 0

---

90. 15

---

91. 6

---

92.  $3 + \frac{1}{2} \log_2 z$

---

93.  $\log_2 [\sqrt{x} (x-8)^2]$

---

94. 124

---

95. 44.29

---

96. 141.52

---

97. 10.3

---

98. 1.2

---

99. 458.28