Set 43

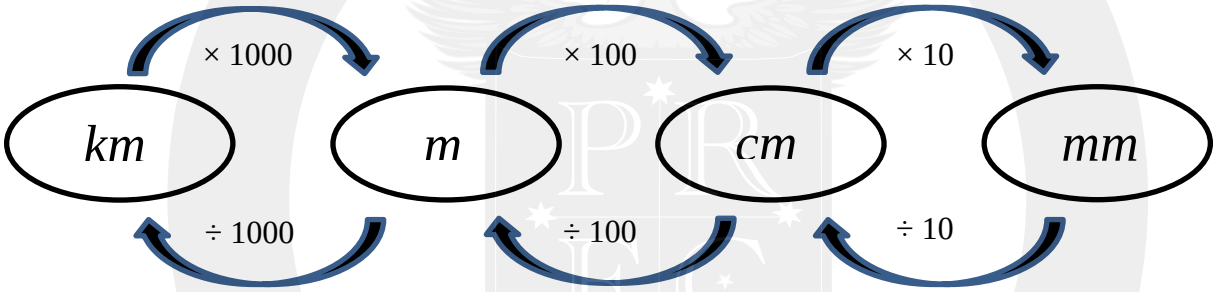
Metric Conversions

These are the sections you must complete in this set:

- ✓ **Topic Questions**
- ✓ **Problem Solving**
- ✓ **Challenge Questions**

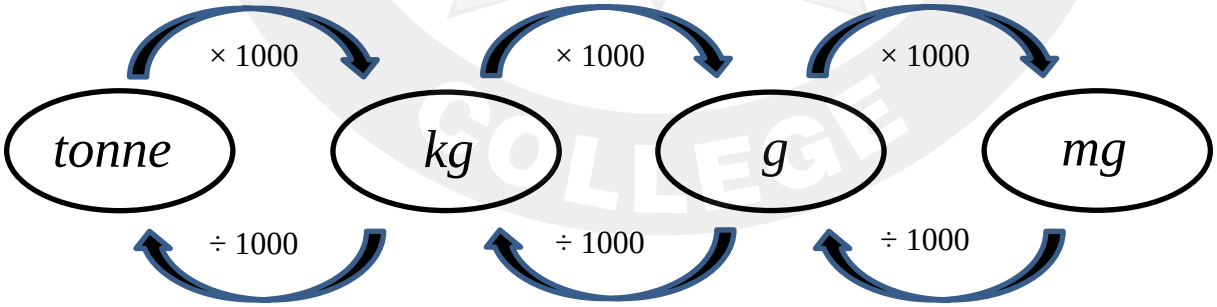
Revision of units of length

The common units are kilometre (km), metre (m), centimetre (cm) and millimetre (mm).



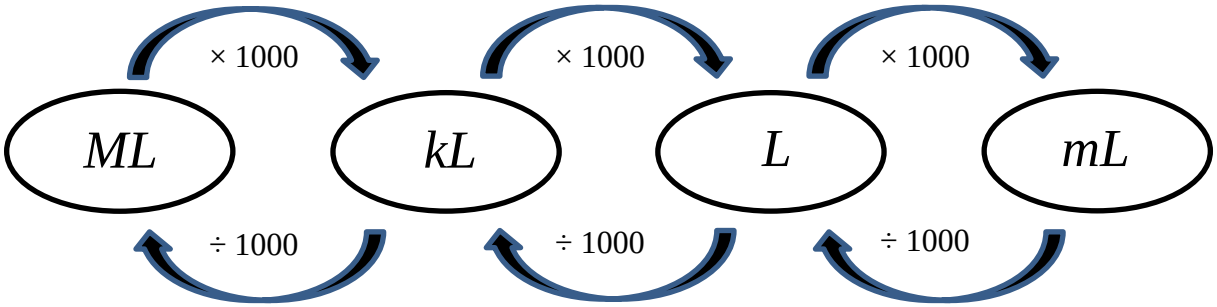
Revision of units of mass

The common units are tonne (t), kilogram (kg), gram (g) and milligram (mg).



Revision of units of capacity

The common units are megalitre (ML), kilolitre (kL), litre (L) and millilitre (mL).



How to convert units

Remember the following rules:

- To convert **from a larger unit to a smaller unit**, we **MULTIPLY**.
- To convert **from a smaller unit to a larger unit**, we **DIVIDE**.

Example: Convert 3.5 km to cm.

Use the conversion factors 1 km = 1 000 metres and 1 metre = 100 cm.

As the conversion is to a **smaller** unit, we **multiply** 3.5 km.

$\therefore$ 3.5 km = 3.5 × 1 000 m = 3 500 m

= 3 500 × 100 cm = 345 000 cm

Example: Convert 850 mm to metres.

Use the conversion factor 1 metre = 1 000 mm.

As the conversion is to a **larger** unit, we **divide** 850 mm.

$\therefore$ 850 mm = 850 ÷ 1 000 m = 0.85 m

Converting units of area and volume

It is important to remember that **area** applies shapes which have two dimensions. It is necessary to convert each dimension separately prior to calculating the area.

To convert square units of area, use the following guide:

- 1 cm² = 10 mm × 10 mm = 100 mm².
- 1 m² = 100 cm × 100 cm = 10 000 cm².
- 1 m² = 1 000 mm × 1 000 mm = 1 000 000 mm².
- 1 km² = 1 000 m × 1 000 m = 1 000 000 m².

Example: 2 750 mm² = 2 750 ÷ 100 = 27.5 mm².

Similarly, **volume** applies to solids with three dimensions. Again, it is necessary to convert each dimension separately prior to calculating the volume.

To convert cubic units of volume, use the following guide:

- 1 cm³ = 10 mm × 10 mm × 10 mm = 1 000 mm³.
- 1 m³ = 100 cm × 100 cm × 100 cm = 1 000 000 cm³.
- 1 m³ = 1 000 mm × 1 000 mm × 1 000 mm = 1 000 000 000 mm³.
- 1 km³ = 1 000 m × 1 000 m × 1 000 m = 1 000 000 000 m³.

Example: 3 750 000 cm³ = 3 750 000 ÷ 1 000 000 = 3.75 m³.

Topic Questions

1. Convert the following lengths:

(a)	275 cm	=	2.75	m	**(b)**	13.5 km	=	13 500	m
(c)	17 500 mm	=	17.5	m	**(d)**	3.5 km	=	350 000	cm
(e)	575 mm	=	57.5	cm	**(f)**	13.65 m	=	1 365	cm
(g)	1.6 m	=	1 600	mm	**(h)**	0.035 km	=	35 000	mm
(i)	45 cm	=	450	mm	**(j)**	75 000 cm	=	0.75	km
(k)	8 750 m	=	8.75	km	**(l)**	400 000 mm	=	0.4	km

2. Convert the following masses:

(a)	950 g	=	0.95	kg	**(b)**	8.39 t	=	8 390	kg
(c)	12 500 mg	=	12.5	kg	**(d)**	0.15 t		150	kg
(e)	6.37 kg	=	6 370	g	**(f)**	5 t		5 000 000	g
(g)	0.035 g		35	mg	**(h)**	0.6 t		600 000 000	mg

3. Convert the following capacities:

(a)	18 L	=	18 000	mL	**(b)**	2.345 kL	=	2 345 000	mL
(c)	540 L	=	0.54	kL	**(d)**	0.07 ML	=	70 000 000	mL
(e)	6 400 mL	=	6.4	L	**(f)**	0.25 ML	=	250 000	L
(g)	8 500 kL	=	8.5	ML	**(h)**	675 000 mL	=	0.675	kL

4. How many 250 mL cups are needed to fill a 6.5 L bucket ?

Answer: 26 cups

5. Sandra buys a box of apples weighing 15 kilograms and plans to divide it evenly with her three friends. How much will each person receive in grams ?

Answer: 3 750 grams

6. James is 1.67 m tall. If he grows 45 mm in the next six months, how tall will he be in cm ?

Answer: 171.5 cm

Problem Solving

1. The local dam is currently 62.5 % full. It has a capacity of 240 000 litres. How much water is being stored in the dam at present in kilolitres ?

Answer: 150 kilolitres

2. A water reservoir on a farm has a capacity of 5 600 kilolitres. It is being replaced by a larger reservoir that has a capacity of $3\frac{3}{4}$ times the original one. How many megalitres will the new reservoir hold ?

Answer: 21 megalitres

3. Solve for x: $2\,(x-4) = 20.$

A 6 **B** 8 **C** 11 **D** 14 **E** 17

Answer: D

4. If seven apples cost \$5.25, how much will a dozen apples cost ?

Answer: \$9.00

5. In a shoe store, there are 450 pairs of shoes. If 86 % of the shoes have laces, what is the number of shoes that do not have laces ?

Answer: 63 pairs = 126 shoes

6. Jenny bought 150 grams of mushrooms at \$11 per kilogram. How much did she spend ?

Answer: \$1.65

7. In a paint factory, each ten litre tin of paint uses $\frac{1}{6}$ of a bucket of water. If $\frac{2}{3}$ of a bucket of water is used, how many four litre tins of paint would be produced.

Answer: 10 four litres tins

Challenge Questions

1. There are 5 water tanks on a farm, each with a capacity of 20 000 litres. If two of the tanks are $\frac{3}{4}$ full and the others are each 30 % full, how much water is stored in kilolitres ?

Answer: 33 kilolitres

2. How many 25 kilogram bags of concrete are there in a batch weighing 6 tonnes ?

Answer: 240 bags

3. Calculate $0.125 \div 0.005$

Answer: 25

4. If 15 % of a certain number is 18, find the number.

Answer: 120

5. To make cookies, Sally needs 5 cups of flour for every 2 eggs. If she wants to make cookies with 5 eggs, how many cups of flour will she need to use ?

Answer: 12.5 cups of flour

6. Sam is tiling his bathroom floor which has an area of 7.5 square metres. If he is using square tiles with a side length of 25 centimetres, how many tiles will he need to cover the floor ?

Answer: 120 tiles

7. Lisa walked at 5 km/h for 3 hours, cycled at 16 km/h for 2 hours and then drove at 60 km/h for 30 minutes. What was her average speed for the entire journey ?

Answer: 14 km/h

8. A car travels 195 kms in 10 800 seconds. What is its speed in kilometres per hour ?

Answer: 65 km/h

🎯 Set 44

Area and Volume

These are the sections you must complete in this set:

- ✓ **Topic Questions**
- ✓ **Problem Solving**
- ✓ **Challenge Questions**

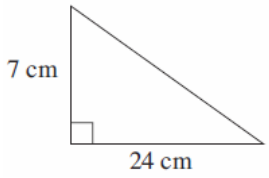
Area review

The term **'area'** is used to define the amount of two-dimensional space occupied by a closed object. There are many different area formulas depending on the type of shape.

- Square $A = length^2$
- Rectangle $A = length \times width$
- Triangle $A = \frac{1}{2}\ base \times height$
- Parallelogram $A = base \times height$
- Circle $A = \pi \times radius^2$
- Trapezium $A = \frac{1}{2}\ (a + b) \times height$

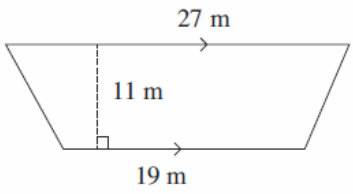
  where a and b are the lengths of the parallel sides.

Example: Find the area of the triangle on the right.



$$\text{Area} = \frac{1}{2}\ \text{b} \times \text{h}$$
$$= \frac{1}{2} \times 24\ \text{cm} \times 7\ \text{cm}$$
$$= 84\ \text{cm}^2$$

Example: Find the area of the trapezium on the right.



$$\text{Area} = \frac{1}{2}\ (a + b) \times \text{h}$$
$$= \frac{1}{2} \times (19\ \text{m} + 27\ \text{m}) \times 11\ \text{m}$$
$$= 253\ \text{m}^2$$

Hectare conversions

Remember the special conversions that apply when using the **hectare** unit:

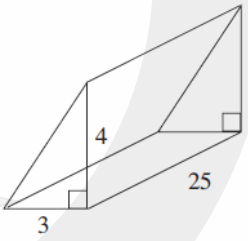
- 1 ha = 10 000 m² and 100 ha = 1 km².

Volume review

The term **'volume'** is used to define the amount of three-dimensional space occupied by a solid or object. There are many different area formulas depending on the type of shape.

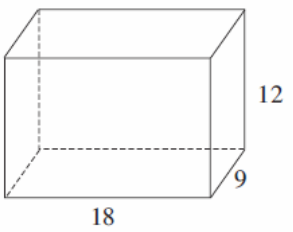
- Cube $V = length^3$
- Rectangular prism $V = length \times width \times height$
- Triangular prism $V = \frac{1}{2}\ base \times height \times length\ of\ prism$
- Pyramid $V = \frac{1}{3}\ length \times width \times height$
- Cylinder $V = \pi \times radius^2 \times height$
- Cone $V = \frac{1}{3}\ \pi \times radius^2 \times height$

Example: Find the volume of the triangular prism on the right.
All measurements are in centimetres.



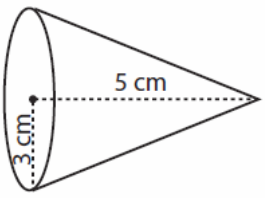
$$\text{Volume} = \frac{1}{2}\ b \times h \times l$$
$$= \frac{1}{2} \times 3\text{ cm} \times 4\text{ cm} \times 25\text{ cm}$$
$$= 150\text{ cm}^3$$

Example: Find the volume of the rectangular prism on the right.
All measurements are in centimetres.



$$\text{Volume} = l \times w \times h$$
$$= 18\text{ cm} \times 9\text{ cm} \times 12\text{ cm}$$
$$= 1\,944\text{ cm}^3.$$

Example: Find the volume of the cone on the right. Use $\pi = 3$.

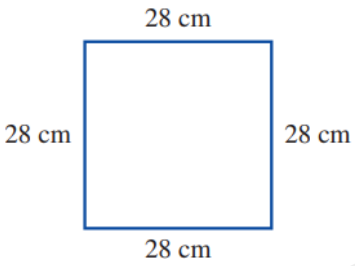


$$\text{Volume} = \frac{1}{3}\ \pi \times r^2 \times h$$
$$= \frac{1}{3} \times 3 \times 3\text{ cm} \times 3\text{ cm} \times 5\text{ cm}$$
$$= 45\text{ cm}^3$$

Topic Questions

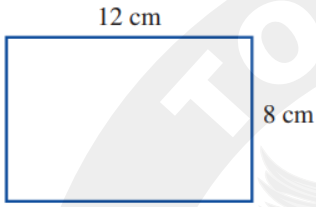
Find the **area** for each of the following shapes:

1.



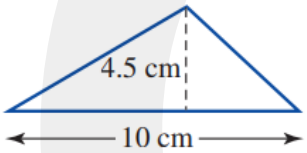
Answer: 784 cm²

2.



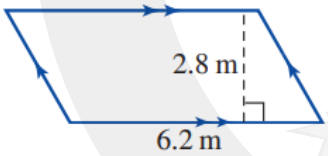
Answer: 96 cm²

3.



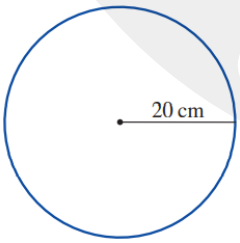
Answer: 22.5 cm²

4.



Answer: 17.36 m²

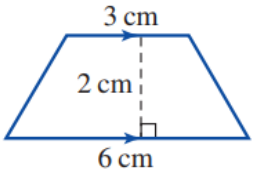
5.



Use $\pi = 3$ for your calculation.

Answer: 1 200 cm²

6.



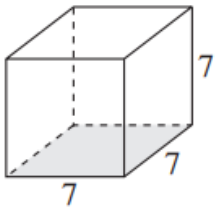
Answer: 9 cm²

7. Find the area of a circle with a diameter of 18 cm. Use $\pi = 3$ for your calculation.

Answer: 243 cm²

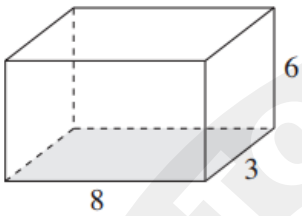
Find the **volume** for each of the following solids. All measurements are in centimetres.

8.



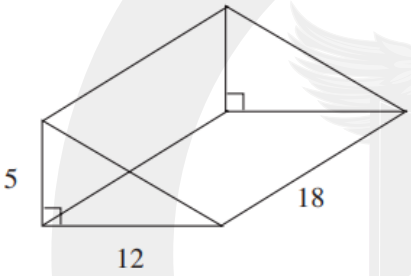
Answer: 343 cm³

9.



Answer: 144 cm³

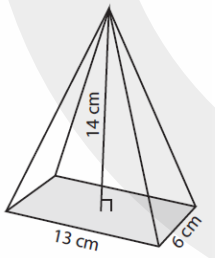
10.



Answer: 540 cm³

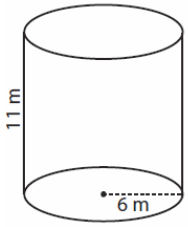
Find the **volume** for each of the following solids.

11.



Answer: 364 cm³

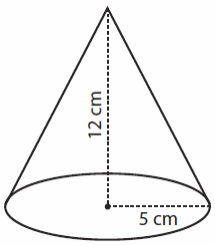
12.



Use $\pi = 3$ for your calculation.

Answer: 1 188 m³

13.



Use $\pi = 3$ for your calculation.

Answer: 300 cm³

Problem Solving

1. A basketball court is 30.6 metres long and 16 metres wide. If Parker and Simon run around the outside of the court 5 times, what combined distance will they have run ?

Answer: 932 metres

2. Allan is 20 years younger than his father. In five years time, he will be half his father's age. How old is Allan now ?

Answer: Allan is 15 years old

3. Simon's average mark after four tests is 88 %. If he scores 100 % in his final test, what will be his average mark ?

Answer: 90.4 %

4. A rectangle has a length that is 22 centimetres greater than its width. If the perimeter of the rectangle is 1.8 metres, what is the width ?

Answer: 34 cm

5. For a dinner held at a restaurant, the cost per person was $42.75. If there were 15 people at the dinner, what was the total cost of the meal ?

Answer: $641.25

6. The price of 5 boxes of chocolates is $82.50. Find the cost of a dozen boxes of chocolates.

Answer: $198.00

7. What is 16.5 % of 25 ?

Answer: 4.125

8. Kate received a 20 % discount on her laptop so that the price she paid was $1 350. What was the original price of the laptop ?

Answer: $1 687.50

Challenge Questions

1. What is the lowest number that leaves a remainder of 1 when divided by 4, 5 or 6 ?

Answer: 61

2. Lucia paid \$60 for her petrol last week. This week she paid \$70.80 for the same amount of petrol. What is the percentage increase ?

Answer: 18 %

3. If 87.5 % of a certain number is 784, what is the number ?

Answer: 896

4. Find the missing number: 2 5 10 17 ? 37 50

Answer: 26

5. A rectangle has an area of 391 cm² and a width of 17 cm. Find its perimeter.

Answer: 80 cm

6. Mia is five years older than her sister Sophia. In three years from now, Sophia will be three-quarters of Mia's age. How old are they both now ?

Answer: Mia is 17 and Sophia is 12.

7. Tim and John both walk their dogs on the first day of the month. If Tim walks his dog every 5 days and John every 3 days, on which day on the month will they meet again ?

Answer: 15th day of the month.

8. A number is multiplied by 15 and the answer is subtracted from 350 to give an answer of 80. What is the number ?

Answer: 18

Set 45

Operations and Rounding

These are the sections you must complete in this set:

- ✓ **Topic Questions**
- ✓ **Problem Solving**
- ✓ **Challenge Questions**

Review of order of operations

BODMAS is the rule that defines the order that these operations must be processed.

B	Brackets are always completed first.
O	Orders. Indicates powers and square roots, etc.
DM	Division & Multiplication, performed left to right.
AS	Addition & Subtraction, performed left to right.

Example:

$56 \div (5 + 2) - 4$ Brackets first
$= 56 \div 7 - 4$ Division next
$= 8 - 4$ Subtraction last
$= 4$

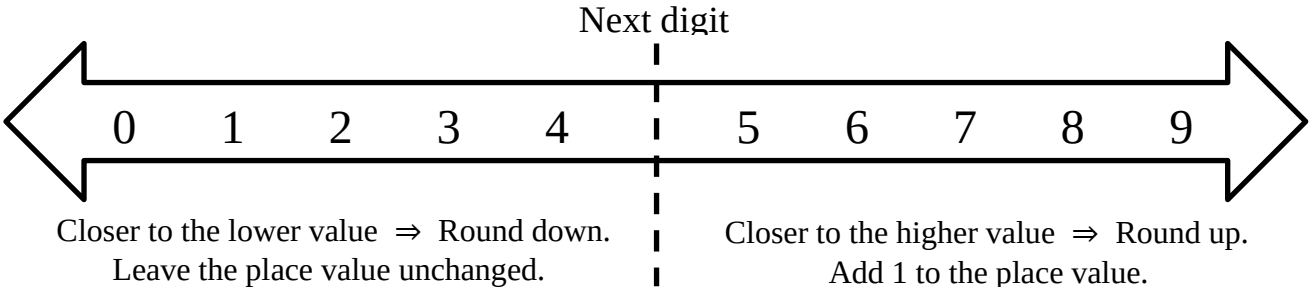
Example:

$36 - 3 \times 8 + 4$ Multiplication first
$= 36 - 24 + 4$ Subtraction next
$= 12 + 4$ Addition last
$= 16$

Example:

2×5^2 Square first
$= 2 \times 25$ Multiplication last
$= 50$

Review of rounding off



Topic Questions

1. Calculate the following:

(a) $28 + 36 \div 6$ *Answer:* 34

(b) $(33 - 25) \times 7$ *Answer:* 56

(c) $16 + 8 \times 12$ *Answer:* 112

(d) $35 - 23 + 9$ *Answer:* 21

(e) $42 + 20 \times 12 \div 5$ *Answer:* 90

(f) $180 - 30 \div 6 \times 12 + 26$ *Answer:* 146

2. Calculate the following:

(a) $28 - 36 \div (-4) + (-12)$ *Answer:* 25

(b) $-15 + (-7) \times 12 \div (-4)$ *Answer:* 6

(c) $4^3 - 3 \times 8 + 10$ *Answer:* 50

(d) $\frac{63 - 15}{11 + 5} + 3 \times 8$ *Answer:* 27

(e) $\frac{48}{5 + 4 + 3} + 3^3$ *Answer:* 31

3. Round off the following numbers to the nearest whole number.

(a) 47.5 48 **(b)** 27.4 27 **(c)** 79.6 80

4. Round off the following numbers to the nearest ten.

(a) 44.9 40 **(b)** 887.6 890 **(c)** 995 1000

5. Round off the following numbers to 1 decimal place.

(a) 75.49 75.5 **(b)** 3.207 3.2 **(c)** 0.456 0.5

6. Round off the following numbers to 2 decimal places.

(a) 1.501 1.50 **(b)** 6.667 6.67 **(c)** 4.2192 4.22

7. Round off the following numbers to 3 decimal places.

(a) 0.5076 0.508 **(b)** 70.7894 70.789 **(c)** 8.9995 9.000

Problem Solving

1. Ray's Sports store has a total of 52 bicycles and tricycles for sale. Jonathan counted a total of 120 wheels. How many bicycles and how many tricycles were for sale ?

Answer: 36 bicycles and 16 tricycles

2. The product of two different positive whole numbers is 144 and their sum is less than 32. What are the possibilities for the two numbers ?

Answer: 6 and 24, 8 and 18, 9 and 16

3. In a box of red, green, and blue coloured chips, all but 10 are red, all but 10 are green, and all but 10 are blue. How many coloured chips are in the box altogether ?

Answer: 15 chips consisting of 5 red, 5 green and 5 blue

4. What is the smaller angle formed between the hour hand and the minute hand at 4:30 pm ?

Answer: 45°

5. There are 12 people in a meeting room. If each person shakes the hand of every other person in the room only once, how many handshakes will there be in total ?

Answer: 66 handshakes

6. The product of the ages of three boys is 252. The sum of their ages is 20.
Find the age of each boy.

Answer: 4, 7 and 9 years old

7. What are the missing characters in this pattern ? *Answer:* 10 and M

5 H 7 J ? ? 14 Q 19 V

8. Find the sum of all the whole numbers from 1 to 50 inclusive ?

Answer: 1 275

Challenge Questions

1. Find the missing number. *Answer:* 84

3	10	24
4	12	40
5	14	60
6	16	?

2. 8, 33, 161, 222 and 2998992 are examples of palindromic numbers. How many palindromic numbers are there from 100 to 1000 inclusive ?

Answer: 90

3. The pages of Sue's book are numbered from 1. The page numbers have a total of 435 digits. How many pages has the book ?

Answer: 181 pages

4. A painter can paint the exterior of a house in 12 days. Working with his apprentice, the same job can be completed in 8 days. How many days would the job take to complete if the apprentice does the job alone ?

Answer: 24 days

5. The length and width of a rectangle are both increased by 40 %. Find the percentage increase in the area of the new rectangle when compared to the original rectangle.

Answer: 96 %

6. A number is less than 50. When the digits of the number are reversed, its value is increased by 75 %. Find the number.

Answer: 36

7. If $\frac{1}{6}$ of a number is 28, what is 62.5 % of the same number ?

Answer: 105

Set 46

Decimals and Fractions

These are the sections you must complete in this set:

- ✓ **Topic Questions**
- ✓ **Problem Solving**
- ✓ **Challenge Questions**

Review of decimals to fractions

When converting decimals to fractions, the denominator will always be a power of 10.

For example, when there is one decimal place, the denominator will be 10. If there are two decimal places, the denominator will be 100. Similarly, if there are three decimal places, the denominator will be 1000, and so on.

Examples: $0.48 = \frac{48}{100} = \frac{24}{50} = \frac{12}{25}$

$0.225 = \frac{225}{1000} = \frac{45}{200} = \frac{9}{40}$

Review of fractions to decimals

Remember that a fraction is simply another way of writing a division. A decimal equivalent can be obtained by dividing the numerator by the denominator using standard division techniques.

A second method involves converting the fraction to an equivalent fraction with a denominator that is a power of ten, namely, 10, 100, 1000, etc. Then convert the fraction to a decimal.

Examples: $\frac{5}{8} = 5 \div 8 = 0.625$ $\quad\quad$ $\frac{7}{28} = 7 \div 28 = 0.25$

$\frac{3}{5} = \frac{6}{10} = 0.6$ $\quad\quad$ $3\frac{7}{20} = 3\frac{35}{100} = 3.35$

Review of fraction types

- **Proper fractions**: The numerator is less than the denominator.
- **Improper fractions**: The numerator is greater than or equal to the denominator.
- **Mixed numbers**: A whole number and a proper fraction together.

Review of reciprocals

To get the reciprocal of a fraction, just turn it upside down. That is, swap over the numerator and the denominator. Remember to first convert all mixed numbers into improper fractions.

Examples: The reciprocal of $\frac{3}{8}$ is $\frac{8}{3}$. The reciprocal of 5 is $\frac{1}{5}$.

The reciprocal of $3\frac{2}{7}$ is $\frac{7}{23}$. The reciprocal of $7\frac{1}{7}$ is $\frac{7}{50}$.

Review of fraction operations

Addition and subtraction

First obtain a common denominator, then add or subtract the numerators. Remember that a common denominator is the *lowest common multiple* (LCM) of the different denominators.

Examples: $\frac{3}{8}+\frac{1}{8}=\frac{4}{8}=\frac{1}{2}$ $\frac{2}{3}-\frac{1}{12}=\frac{8}{12}-\frac{1}{12}=\frac{7}{12}$

$\frac{2}{3}+\frac{3}{5}=\frac{10}{15}+\frac{9}{15}=\frac{19}{15}=1\frac{4}{15}$

Multiplying fractions

Remember that common denominators are not required. Multiply all numerators separately and then all denominators separately. All mixed numbers must be converted to improper fractions prior to multiplication. Simplify the final answer where possible.

Examples: $\frac{3}{8}\times\frac{3}{5}=\frac{3\times3}{8\times5}=\frac{9}{40}$

$2\frac{4}{5}\times3\frac{2}{7}=\frac{14}{5}\times\frac{23}{7}=\frac{14\times23}{5\times7}=\frac{2\times23}{5\times1}=\frac{46}{5}=9\frac{1}{5}$

Dividing fractions

First convert all mixed numbers into improper fractions. Change the divide sign into a multiply sign reciprocate (flip) the second fraction. Now multiply the fractions as shown above.

Examples: $\frac{3}{8}\div\frac{3}{5}=\frac{3}{8}\times\frac{5}{3}=\frac{3\times5}{8\times3}=\frac{5}{8}$

$2\frac{4}{5}\times3\frac{2}{7}=\frac{14}{5}\times\frac{23}{7}=\frac{14\times23}{5\times7}=\frac{2\times23}{5\times1}=\frac{46}{5}=9\frac{1}{5}$

Topic Questions

1. Evaluate the following. Express answers in simplest form.

(a) $\frac{4}{7} + \frac{6}{7}$ $1\frac{3}{7}$ **(b)** $\frac{7}{9} + \frac{2}{15}$ $\frac{41}{45}$

(c) $3\frac{1}{5} + 2\frac{5}{8}$ $5\frac{33}{40}$ **(d)** $2\frac{3}{8} + 1\frac{17}{24}$ $4\frac{1}{12}$

2. Evaluate the following. Express answers in simplest form.

(a) $\frac{9}{11} - \frac{4}{11}$ $\frac{5}{11}$ **(b)** $\frac{6}{7} - \frac{3}{5}$ $\frac{9}{35}$

(c) $3\frac{4}{5} - 1\frac{5}{8}$ $2\frac{7}{40}$ **(d)** $3\frac{4}{5} - \frac{5}{6}$ $2\frac{29}{30}$

3. Evaluate the following. Express answers in simplest form.

(a) $\frac{5}{11} \times \frac{7}{15}$ $\frac{7}{33}$ **(b)** $\frac{9}{10} \times \frac{40}{54}$ $\frac{2}{3}$

(c) $2\frac{1}{8} \times \frac{4}{9}$ $\frac{17}{18}$ **(d)** $3\frac{1}{4} \times 2\frac{1}{3}$ $7\frac{7}{12}$

4. Evaluate the following. Express answers in simplest form.

(a) $\frac{1}{2} \div \frac{7}{8}$ $\frac{4}{7}$ **(b)** $\frac{7}{9} \div 3$ $\frac{7}{27}$

(c) $1\frac{5}{8} \div \frac{3}{7}$ $3\frac{19}{24}$ **(d)** $4\frac{4}{9} \div 1\frac{1}{2}$ $2\frac{26}{27}$

5. Change the following fractions to decimals.

(a) $\frac{37}{50}$ 0.74 **(b)** $\frac{18}{300}$ 0.06

(c) $\frac{17}{80}$ 0.2125 **(d)** $\frac{67}{125}$ 0.536

6. Change the following decimals to fractions. Express answers in simplest form.

(a) 0.26 $\frac{13}{50}$ **(b)** 0.007 5 $\frac{3}{400}$

(c) 0.162 5 $\frac{13}{80}$ **(d)** 0.568 $\frac{71}{125}$

7. Calculate the following, giving the answer as a decimal.

$36\,\% + \frac{3}{8} - 0.175$ *Answer:* 0.56

Problem Solving

1. A clothes store had a pair of jeans priced at $116. It increased the price by 25 %. A week later the price was discounted 25 %. What is the new price of the jeans ?

Answer: $108.75

2. A car's fuel tank is one-quarter full and its owner adds 32.5 litres of petrol. If the tank is now 75 % full, what is the total capacity of the tank ?

Answer: 65 litres

3. The cost of a pen is 60 cents more than the cost of a pencil. Angela spent $9.40 when she bought five pens and three pencils. What is the cost of each ?

Answer: Pens are $1.40 cents each and pencils are 80 cents each.

4. Last year, Jerry was three times as old as Nancy. In 6 years time he will be twice as old as Nancy. How old is Jerry today ?

Answer: Jerry is 22 years old

5. Jordan has planted a rectangular lawn in his yard with dimensions 15 metres by 8 metres. He lays a path around the outside of the lawn. The path is 1.5 metres wide. What is the area of the path ?

Answer: 78 m^2

6. A photograph is 32 cm by 20 cm. It is to be mounted on cardboard in a photo frame with a 2.5 cm border between the photo frame and the edge of the photograph. What is the area of the cardboard that can be seen ?

Answer: 285 cm^2

7. A quadrant of circle has a radius of 12 cm. Using $\pi = 3$ as an approximation, find the area and the perimeter of the quadrant.

Answer: Area = 108 cm^2 , Perimeter = 42 cm

Challenge Questions

1. A small cube has dimensions 8 cm × 8 cm × 8 cm. Calculate the number of small cubes that would fit into a rectangular box with dimensions 50 cm × 65 cm × 32 cm.

Answer: 192 small cubes

2. If the side lengths of a cube are all increased by 20 %, what percentage increase will be applied to the volume of the cube ?

Answer: 72.8 %

3. A tank of water is only 50 % full. Some of the water is then poured into 8 small containers each with a volume of 125 cm^3. The tank is then only 40 % full. What is the capacity of the tank if it was 100 % full ?

Answer: 10 litres

4. What two angles are formed by the hour and minute hands on a clock at exactly 2:30 pm ?

Answer: 105° and 255°

5. Jack and Jill both leave at 9 am to travel from Melbourne to their holiday house. Jill travels at 70 km/h and reaches the house at 2:30 pm. Jack had already arrived 30 minutes before Jill. How fast did Jack drive ?

Answer: 77 km/h

6. A speedboat travels 1 200 metres up a river in 4 minutes. What is the boat's average speed in km/h ?

Answer: 18 km/h

7. A van left town A and travelled at an average speed of 72 km/h. Twenty minutes later, a car started from town A and travelled along the same route as the van. If the car caught up with the van after a distance of 78 km, find the average speed of the car.

Answer: 104 km/h