6 Mental Strategies + and −

A Using Tidy Numbers

Examples : Calculate : a) 294 + 85 b) 360 − 93

Working : Split the second number to make the first one tidy.

a) 294 + 85 = 294 + 6 + 79 = 379

b) 360 − 93 = 360 − 60 − 33 = 267

1 Calculate.

a) 392 + 53 .....

b) 537 + 24 .....

c) 770 + 89 .....

d) 645 − 7 .....

e) 440 − 52 .....

f) 814 − 35 .....

Examples : Complete these additions.
a) 37 + ... = 79 b) 230 + ... = 820

Working : Starting at the first number, make a big jump in tens or hundreds to get close to the end result. Then make an adjustment up or down.

a) Since 37 + 40 = 77, then 37 + 42 = 79

b) Since 230 + 600 = 830, then 230 + 590 = 820

2 Complete these additions

a) 48 + ... = 99

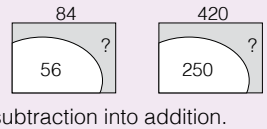
b) 212 + ... = 246

c) 310 + ... = 540

d) ..... + 620 = 825

e) ..... + 250 = 640

Examples : Subtract these.
a) 84 − 56
b) 420 − 250



Working : Mentally change the subtraction into addition. Then use the strategy you practised above to find the missing number.

a) Since 56 + ...28... = 84, then 84 − 56 = ...28...

b) Since 250 + ...170... = 420, then 420 − 250 = ...170...

3 Subtract

a) 72 − 35 ..... b) 51 − 22 .....

c) 145 − 93 ..... d) 930 − 440 .....

e) 725 − 680 ..... f) 608 − 310 .....

B Reading Sets of Tens, Hundreds & Thousands

Examples : Calculate a) 3800 + 700 b) 410 − 50

Working :

a) Read : 38 hundreds plus 7 hundreds make 45 hundreds,
So 3800 + 700 = 4500.

b) Read : 41 tens take away 5 tens leave 36 tens,
So 410 − 50 = 360

1 Try these.

a) 630 + 80 .....

b) 5800 + 500 .....

c) 810 − 60 .....

d) 9600 − 700 .....

e) 34000 − 8000 .....

f) 960 + 70 .....

Examples : Calculate a) 288 + 54 b) 1669 − 910
c) 453 − 26

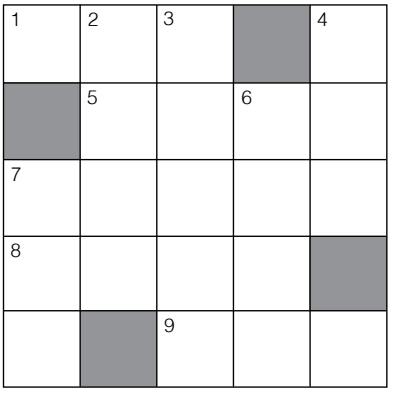
Working :

a) 28 tens (and 8) plus 5 tens (and 4) make 33 tens (and 12).
So, 288 + 54 = 330 + 12 = 342

b) 16 hundreds (and 69) take away 9 hundreds (and 10) leave 7 hundreds (and 59).
So, 1669 − 910 = 700 + 59 = 759

c) 45 tens (and 3) take away 2 tens (and 6) leave 43 tens (with 3 short).
So, 453 − 26 = 430 − 3 = 427

2 Use the strategy to complete this cross number.



clues across

1. 460 + 81
5. 2957 + 310
7. 27150 − 442
8. 4802 − 508
9. 626 − 87

clues down

2. 3520 + 842
3. 9795 + 3000
4. 1083 − 405
6. 5213 + 830
7. 315 − 72

A Counting Factors

Examples : a) List all factors of 20.
b) How many factors has 16?

Working :

a) Find pairs of numbers that multiply to make 20; each pair is a pair of factors. $20 = 1 \times 20$, or 2×10, or 4×5
Answer : 1, 2, 4, 5, 10, 20.

b) $16 = 1 \times 16$, or 2×8, or 4×4. The factors of 16 are 1, 2, 4, 8, 16. Note : the factor 4 is only written once.
Answer : 5 factors.

1a) List all factors of 12.

.....

factors of 12 : .....

b) List all factors of 25.

.....

factors of 25 : .....

2 How many factors has 28?

.....

28 has ..... factors.

Prime numbers are numbers with exactly two factors, namely 1 and the number itself.

Example : 5 9 15 19 Which of these numbers are prime?

Working : $5 = 1 \times 5$ $9 = 1 \times 9$ $9 = 3 \times 3$ $15 = 1 \times 15$ $15 = 3 \times 5$ $19 = 1 \times 19$

Answer : 5 and 19 have exactly 2 factors.
5 and 19 are primes.

3 Follow these steps to find all primes between 20 and 30.

a) Explain why the even numbers between 20 and 30 can't be primes. .....

.....

b) Here are the odd numbers between 20 and 30. Circle the primes.

21 23 25 27 29

4 Work out which numbers between 40 and 50 are primes.

.....

.....

5 Use divisibility tests on the number 57. Is 57 a prime number?

.....

B Monster Hot Air Balloons

1 Each monster balloon has its own special number. Read the clues and write the correct number in each balloon basket.

a) The only even prime number.

b) The largest square number under 200.

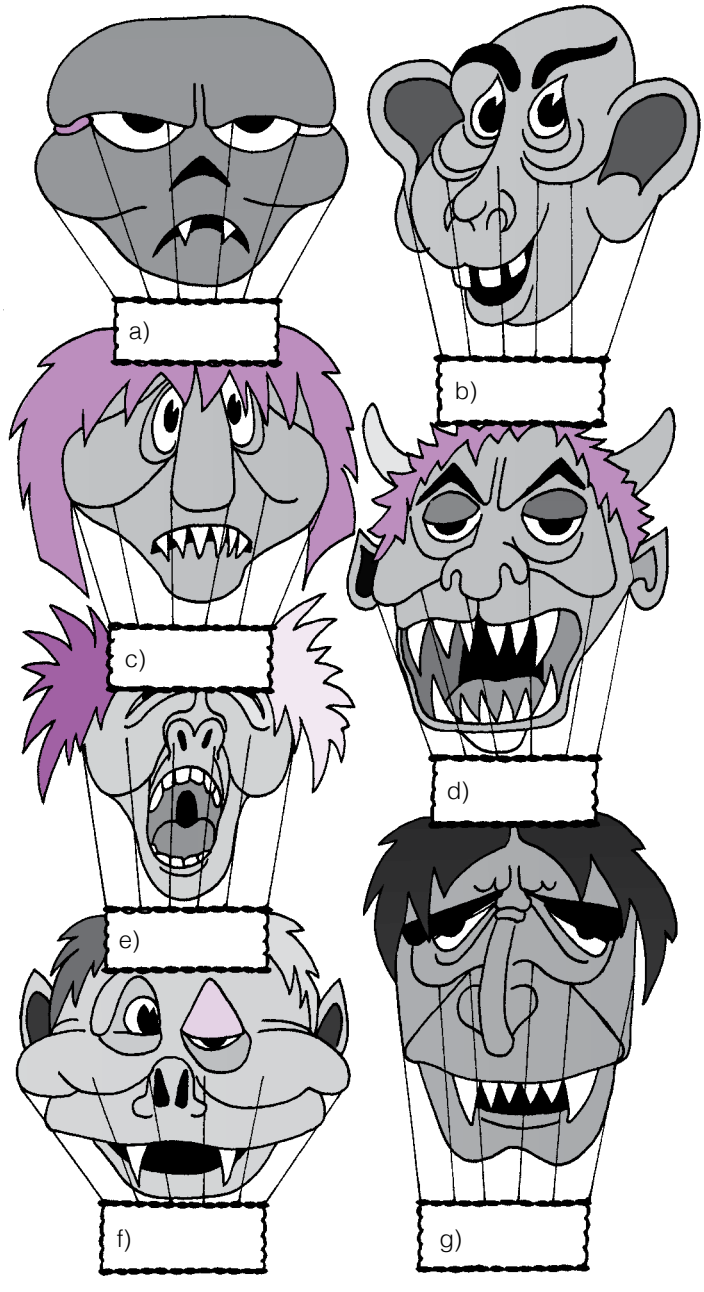
c) The largest prime number under 100.

d) This number has only one factor.

e) The lowest common multiple of 6 and 8.

f) The number of factors of 72.

g) The largest multiple of 3 under 2000.



30 Decimals x and ÷

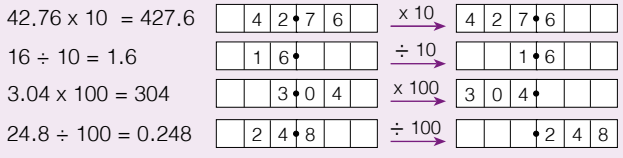
A Digits on the Move

hundreds	tens	ones	tenths	hundredths	thousandths

10 thousandths make a hundredth,
10 hundredths make a tenth,
10 tenths make a one, etc.

Every time we multiply a number by 10, the digits in the number move up one place value. Every time we divide a number by 10, the digits in the number move down one place value.

Examples :



1 Multiply.

a) 3.5 x 10 ..... b) 12.9 x 10 .....

c) 0.048 x 100 ..... d) 100 x 95.1 .....

e) 1000 x 1.2 ..... f) 67.4 ÷ 10 .....

g) 0.8 x 100 ..... h) 3 ÷ 10 .....

i) 750 ÷ 100 ..... j) 96 ÷ 1000 .....

k) 0.32 ÷ 10 ..... l) 0.9 x 1000 .....

Examples : Multiply a) 6 x 0.7 b) 9 x 0.008

Working :

a) 6 lots of 7 tenths equal 42 tenths. Since every 10 tenths make a one, then 42 tenths make 4 ones and 2 tenths.
6 x 0.7 = 4.2

b) 9 lots of 8 thousandths equal 72 thousandths. Since every 10 thousandths make a hundredth, then 72 thousandths make 7 hundredths and 2 thousandths.
9 x 0.008 = 0.072

2 Check these multiplications. If you think the answer is wrong, write the correct answer next to it.

✓ or ✗

a) 5 x 0.04 = 0.2 .....

b) 4 x 0.8 = 3.2 .....

c) 9 x 0.02 = 0.018 .....

d) 5 x 0.6 = 3 .....

e) 8 x 0.7 = 0.56 .....

f) 0.3 x 8 = 2.4 .....

g) 0.05 x 6 = 0.03 .....

B Say It Out Loud

1 Multiply.

a) 4 x 0.3 = ... b) 5 x 0.08 = ...

c) 3 x 0.9 = ... d) 7 x 0.02 = ...

e) 8 x 0.004 = ...

3 Complete these sentences

a) Since 4 x ..... = 0.16, then $\frac{0.16}{4}$ = ...

b) Since 9 x ..... = 2.7, then $\frac{2.7}{9}$ = ...

c) Since 5 x ..... = 0.030, then $\frac{0.030}{5}$ = ...

Divisions can be made easier by the way we read the numbers.

Examples : Divide a) $\frac{3.6}{9}$ b) $\frac{0.042}{7}$

Working :

a) 3.6 can be read as 3 ones and 6 tenths, but also as 36 tenths.
36 tenths divided by 9 is 4 tenths.

b) 0.042 can be read as 4 hundredths and 2 thousandths, but also as 42 thousandths.
42 thousandths divided by 7 is 6 thousandths.

Answers : a) $\frac{3.6}{9}$ = 0.4 b) $\frac{0.042}{7}$ = 0.006

3 Divide.

a) $\frac{0.8}{4}$ ..... b) $\frac{0.08}{2}$ .....

c) $\frac{0.009}{3}$ ..... d) $\frac{2.4}{6}$ .....

e) $\frac{0.49}{7}$ ..... f) $\frac{0.032}{4}$ .....

g) $\frac{0.072}{8}$ ..... h) $\frac{4.5}{9}$ .....

i) $\frac{0.28}{7}$ ..... j) $\frac{3.0}{5}$ .....

4 Complete these sentences.

a) Since 12 ÷ 10 = ... 1.2 ....., then 12 ÷ 5 = ...
and 12 ÷ 20 = ...

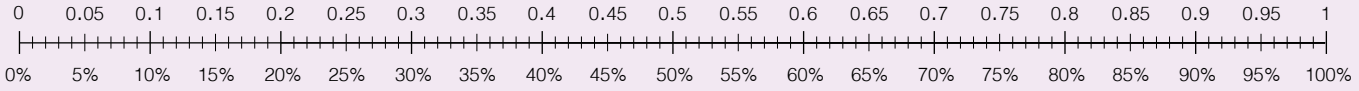
b) Since 4.6 ÷ 10 = ..., then 4.6 ÷ 5 = ...
and 4.6 ÷ 20 = ...

5 Calculate.

a) 0.6 ÷ 5 ..... b) 0.6 ÷ 20 .....

Per-cent means *out of 100*; 5% means *5 out of 100* or $\frac{5}{100}$ or 0.05.
This number line shows how decimal numbers are linked to percentages.
It shows that 1 = 100%; 0.5 = 50%; 0.25 = 25%; 0.05 = 5%; etc.

35% = $\frac{35}{100}$ = 0.35



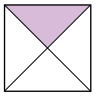
A Practise the Basics

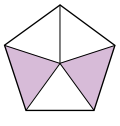
1 Show the different notations.

	percentage	=	fraction	=	decimal
e.g.	65%	=	$\frac{65}{100}$	=	0.65
a)	18%	=	.....	=	.....
b)	3%	=	.....	=	.....
c)	.....	=	$\frac{92}{100}$	=	.....
d)	.....	=	$\frac{1}{100}$	=	.....
e)	.....	=	.....	=	0.09
f)	.....	=	.....	=	0.40

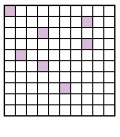
These number lines link commonly used percentages to fractions.

2 For each diagram write what percentage of the shape is shaded purple and what percentage is left white.

a)  purple .....% white .....%

b)  purple .....% white .....%

c)  purple .....% white .....%

d)  purple .....% white .....%

B Percentages are Everywhere

1 Of one hundred marathon runners thirty-five are female.

a) What fraction of the runners are female? .....

b) What percentage of the runners are female? .....

2 Ben gets $10 pocket money. He uses $8 to top up his cellphone. What part of Ben's pocket money is spent on his phone?

a) fraction ..... b) percentage .....

3 There are 50 clocks in the museum. Fourteen of these are still able to tell time.

a) Change the fraction $\frac{14}{50}$ into a fraction with 100 in the denominator. $\frac{14}{50}$ = $\frac{.....}{100}$

b) What percentage of the clocks are still able to tell time? .....

4 Show the different notations.

	fraction	=	fraction $\frac{.....}{100}$	=	percentage
a)	$\frac{33}{50}$	=	.....	=	.....
b)	$\frac{3}{20}$	=	.....	=	.....
c)	$\frac{21}{25}$	=	.....	=	.....

5 A lifestyle block has an area of 20 acres. Six acres are planted in avocados. What percentage is planted in avocados?

.....

6 It is 25 km from Rangi's house to school. Of this distance, 16 km is on unsealed road. What percentage of the road to school is unsealed?

.....

46 Variables

A Letters for Numbers

In algebra we use a letter to represent an unknown number.

Examples :

a) There were x jaffas in a box.
How many jaffas are left after 10 are eaten?

b) If n is my lucky number,
what would be the square of my lucky number?

c) Peter is p years old, Jake is twice as old as Peter.
How old is Jake?

Answers : a) $x - 10$ b) $n \times n$ c) $2 \times p$

Vocabulary :

n, x and p are called **variables**.
The answers $x - 10$, $n \times n$ and $2 \times p$ are called **expressions**.

1 In Tahu's class there are n boys. There are two more girls than boys. How many girls are in Tahu's class?

.....

2 Chen has y playstation games. Jerry has three times as many. How many playstation games has Jerry?

.....

3 The weight of two batteries is w grams.
Write an expression for the weight of one battery.

.....

4 'I'm thinking of a number, I square the number and add one.'
Use p for the original number and write an expression for the result.

.....

5a) Anton takes a pack of cards and deals 4 hands of n cards.
How many cards has Anton dealt?

.....

b) A full pack of playing cards has 52 cards. Write an expression for the amount of cards left in the pack.

.....

B Generalising Computation Rules

We also use variables if we want to show that some computation rule is true for any number.

1 Calculate these.

a) 6 x 0 ..... b) 4 x 1 .....

c) 1 x 9 ..... d) 0 x 7 .....

2 Complete these rules.

If n stands for any number, then . . .

$n \times 0 =$ ..... $0 \times n =$ .....

$n \times 1 =$ ..... $1 \times n =$ .....

3 Write these additions as a multiplication.

a) 3 + 3 + 3 + 3 = ... x **3**

b) 5 + 5 + 5 + 5 = ... x .....

c) 2 + 2 + 2 + 2 + 2 + 2 = ... x .....

d) 8 + 8 + 8 + 8 + 8 + 8 = ... x .....

4 Complete these rules.

If n stands for any number, then . . .

$n + n + n + n =$ ..... x n

$n + n + n + n + n + n =$ ..... x .....

5 Write these multiplications in power form. The first one is done for you.

a) 2 x 2 x 2 x 2 ..... **$= 2^4$**

b) 6 x 6 x 6 x 6 .....

c) 9 x 9 x 9 x 9 x 9 x 9 .....

d) 7 x 7 x 7 x 7 x 7 x 7 .....

6 Complete these rules.

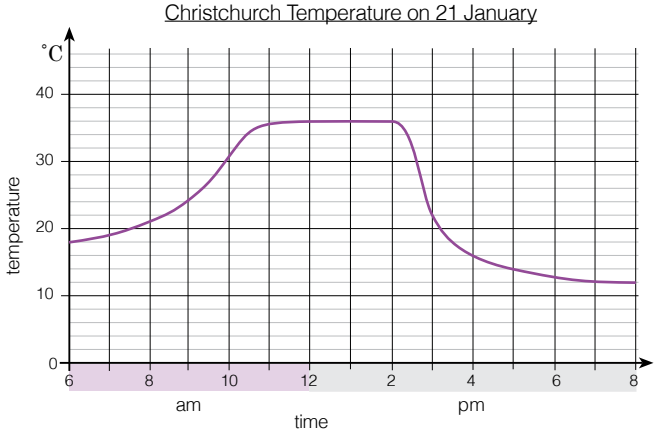
If n stands for any number, then . . .

$n \times n \times n \times n =$ .....

$n \times n \times n \times n \times n \times n =$ .....

A Wind Change

1 The temperature in Christchurch can change rapidly with a shift in wind direction. This graph shows how the temperature changed one summer's day.



a) What was the temperature at 7 am? .....

b) What was the maximum temperature of the day? .....

When was it reached? .....

c) A wind shift caused a sudden change in temperature.

When did that start? .....

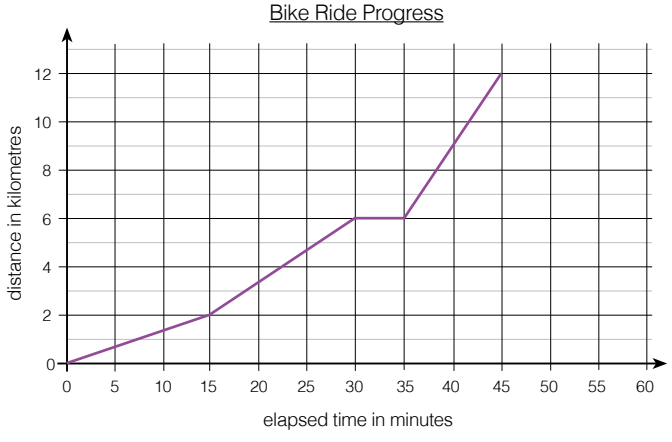
d) How many degrees did the temperature drop in the first hour after the wind shift? .....

e) At what time had the temperature dropped below 16°?

.....

B Bike Ride

1 Tom and Harry went for a bike ride one Saturday morning. The graph shows their progress in 5 minute intervals after they left home.



a) How many kilometres did they cover in the first 15 minutes?

..... How many in the next 15 minutes? .....

b) Did the boys go faster or slower during the second 15 minutes of the ride? .....

c) The steeper the graph the greater the speed.

Do you agree with this statement? .....

d) After half an hour of biking the boys had a rest. How does the graph show that? .....

e) How many kilometres did they cover after their rest? .....

C Four Buckets

1 Rebekah is using four buckets.

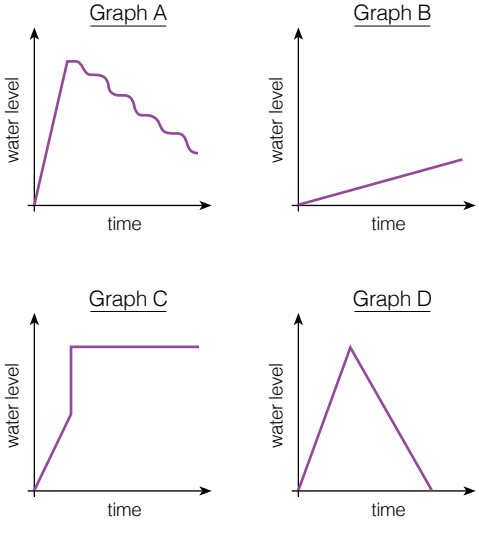
a) She puts one bucket under a tap which is dripping, filling it slowly. Which of the four graphs show how the water level in this bucket changes over time?

Graph .....

b) She half fills another bucket with soapy water, then she puts in a load of washing and leaves it to soak. This is shown by graph .....

c) The third bucket is filled with water but it develops a hole and all the water runs out. This is shown in graph .....

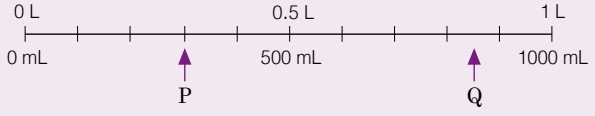
d) The last bucket is filled with soapy water and used to clean the car with a sponge. This is shown in graph .....



A Units

Capacity is a word we use for the volume of containers.
The base unit for capacity is **litres**. For small volumes we can use **millilitres**. 1 L = 1000 mL

Example : Read off measurements at P and Q in L and in mL.



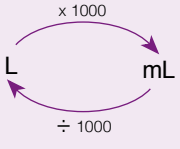
Answer : P is at 0.3 L or 300 mL
Q is at 0.85 L or 850 mL

1 Use the scale in the example to complete these.

a) 400 mL = ... L b) ..... mL = 0.6 L

c) 250 mL = ... L d) ..... mL = 0.15 L

Diagram for converting units of volume.



To convert from L to mL multiply by 1000.

To convert from mL to L divide by 1000.

2 Fill in.

a) 680 mL = ... L b) 0.21 L = ... mL

c) 0.03 L = ... mL d) 990 mL = ... L

e) 5 L = ... mL f) 5 mL = ... L

3 Colour red the labels which indicate a volume over 1 litre.

750 mL	3300 mL	1150 mL	0.95 L
600 mL	1.25 L	5 mL	10.5 L

4 Each of the labels below must be written in two units, L and mL.

a) 1.5 L / ***1500 mL***

b) 0.04 L / .....

c) 1.2 L / .....

d) ..... / 30 000 mL

e) ..... / 50 mL

f) ..... / 375 mL

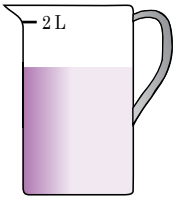
B Some Juicy Questions

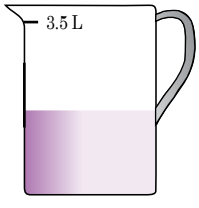
1 Below is a list of containers of different sizes. Match each container with its most likely capacity.

container	capacity
teacup	10 L
bucket	10 mL
tablespoon	100 L
can of coke	100 mL
bath	350 mL

2 Estimate the amount of juice in each jug. Give your answer first in litres, then in millilitres.

a) 

b) 

c) 

a) ..... L ..... mL

b) ..... L ..... mL

c) ..... L ..... mL

3 Keisha opens a new 2.5 L bottle of juice and pours herself a 200 mL glass full.

a) How much juice is left in the bottle? (You choose the unit.)

.....

.....

b) How many 200 mL glasses can be poured from a 2.5 L bottle of juice?

.....

.....

4 This is the label on a cordial bottle.

Berry Flavoured Cordial
750 mL
Makes 5 L of berry flavoured drink

a) How much cordial should be used to make 1 L of drink?

.....

.....

b) How much water should be added to the cordial to make 1 L of drink? .....

.....

A Formula for Volume

The work on the previous pages can be summarised with this formula for the volume of a prism : $V = A \times H$.

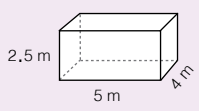
V is short for volume,

A is short for the area of the base,

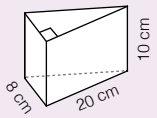
H is short for height of the prism.

Examples : Calculate the volumes of these prisms

a)



b)

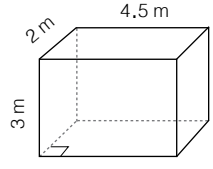


Working : a) The base is a rectangle ▭ with area = 4 x 5 = 20 m^2
The height is 2.5 m
Volume = 20 x 2.5 = 50 m^3

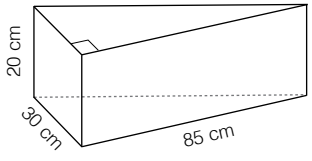
b) The base is a triangle ◺ with area = 0.5 x 20 x 8 = 80 cm^2
The height is 10 cm.
Volume = 80 x 10 = 800 cm^3

1 Calculate the volumes of these solids.

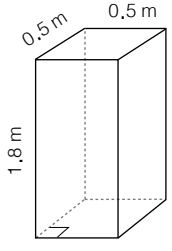
a)



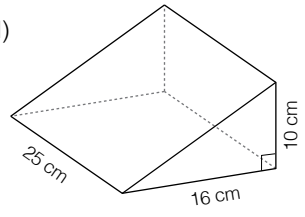
b)

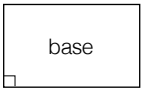


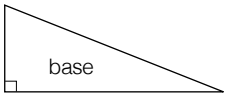
c)

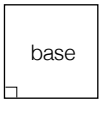


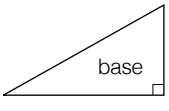
d)











A = ... A = ... A = ... A = ...

H = ... H = ... H = ... H = ...

V = ... V = ... V = ... V = ...

B Practical Exercise

1a) Find two solids at home, for instance a speaker box and a drawer, or a filing cabinet and a bookcase.

I found a ..... and a .....

b) Without doing any measuring, write a sentence on how you think the volumes of the two solids compare. e.g. about the same, one has twice the volume of the other.

I think .....

2a) Take outside measurements and calculate the volume of the two items.

first : .....

second : .....

b) How do the items compare? Was your estimate about right? .....

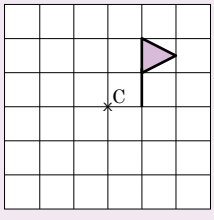
.....

A Around We Go!

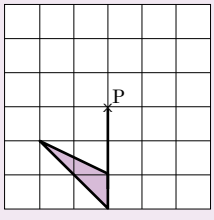
A **rotation** turns an object around a point called the **centre**. The angle of rotation is measured anticlockwise.

Examples : Rotate these objects.

a) half turn, centre C.



b) quarter turn, centre P.



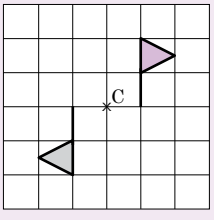
Working : for a)

Copy the object onto tracing paper, also copy C and draw a line going up from C like this :

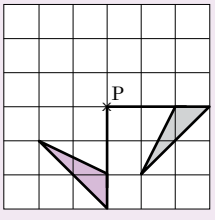
Place your pencil on top of the × on the tracing paper and turn the paper until the line points down (that is a half turn).

Copy the flag back onto your book.

Answers : a)

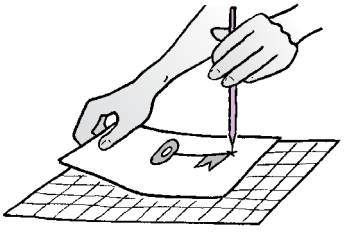


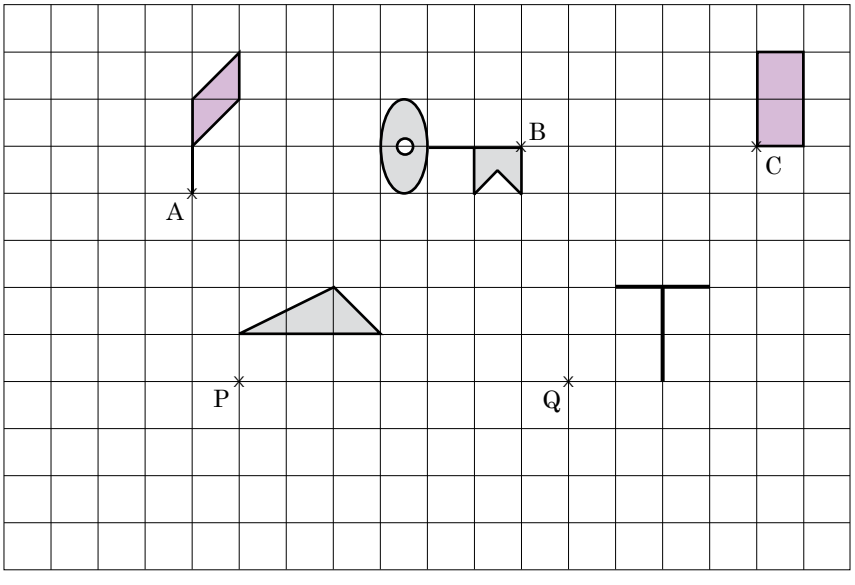
b)



1a) Rotate the flag one quarter turn, centre A.
b) Rotate the key one quarter turn, centre B.
c) Rotate the rectangle a half turn, centre C.

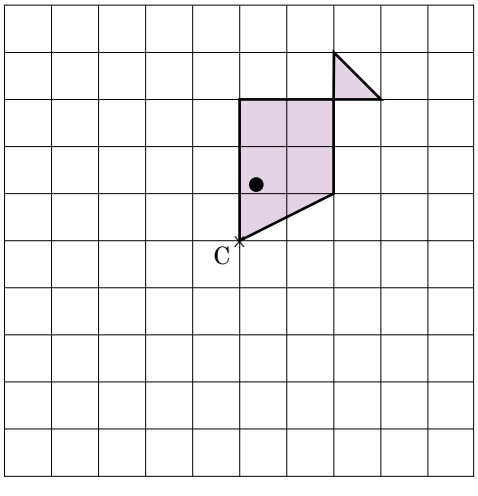
2a) Rotate the triangle a half turn, centre P.
b) Rotate the letter T three quarter turns, centre Q.



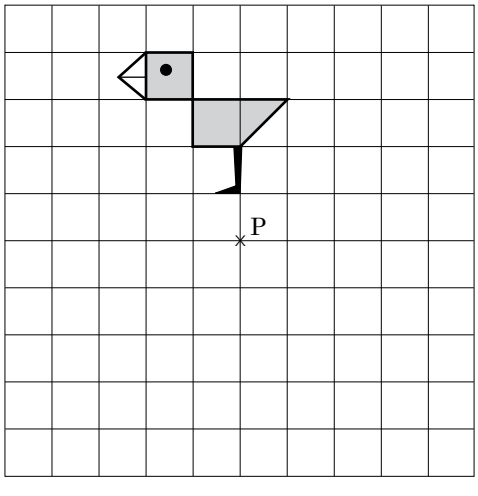


B Keep Turning

1 The centre of rotation is C.
a) Rotate the fish one quarter turn.
b) Rotate the fish one half turn.
c) Rotate the fish a three quarter turn.

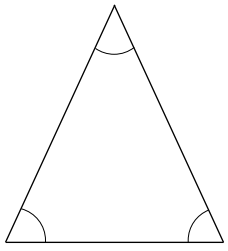


2 The centre of rotation is P.
a) Rotate the pukeko chick one quarter turn.
b) Rotate the pukeko chick a three quarter turn.
c) Rotate the pukeko chick half a turn.



A Taking sides

1



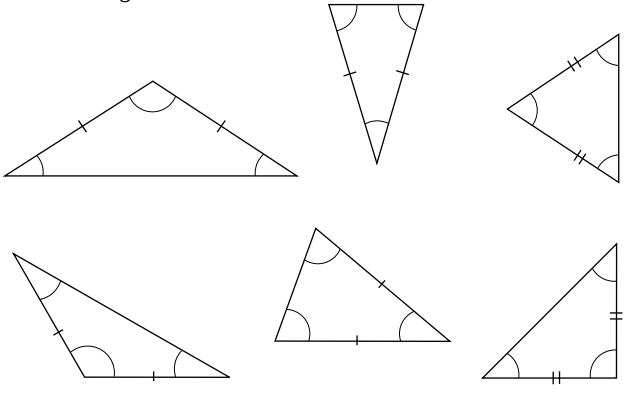
a) What do you know about the sides of an isosceles triangle?

.....

b) Draw the axis of symmetry in this isosceles triangle.

c) Colour with red two equal angles.

2 The two equal angles in an isosceles triangle are called base angles. In each of these isosceles triangles colour the base angles red.



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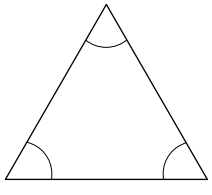
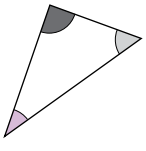


What do you know about sides and angles of an equilateral triangle?

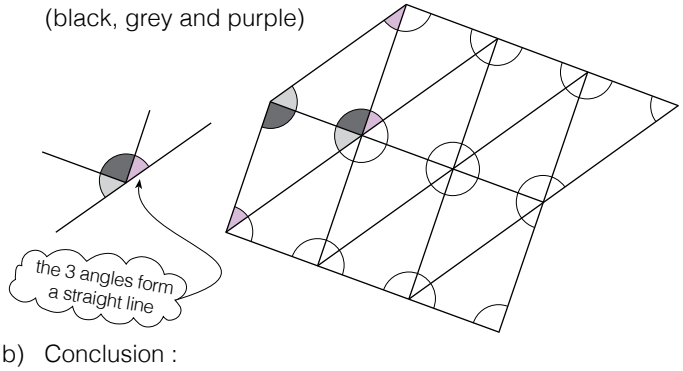
.....

.....

4 On a piece of cardboard we drew a triangle. We used it as a template to cut 12 identical triangles and we made a tessellation.



a) Carefully colour the angles of all the triangles in the tessellation. (black, grey and purple)

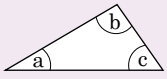


b) Conclusion :

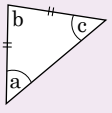
The three angles inside a triangle add up to .....°

B Using Triangle Rules

Rule 4 : Angles inside a triangle add to 180° :
$a + b + c = 180^\circ$

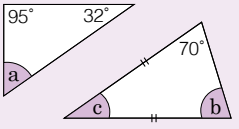


Rule 5 :



Base angles in an isosceles triangle are equal : $a = c$
[the equal angles are opposite the equal sides]

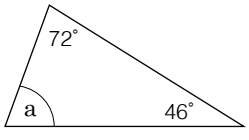
Example :
Calculate the size of angles a, b and c.

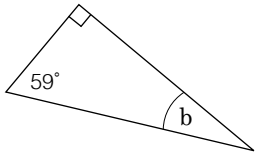


Working :
$a + 95^\circ + 32^\circ = 180^\circ$ (Rule 4)
$a = 180^\circ - 95^\circ - 32^\circ = 53^\circ$
$b = 70^\circ$ (Rule 5)
$c + 70^\circ + 70^\circ = 180^\circ$ (Rule 4)
$c = 180^\circ - 70^\circ - 70^\circ = 40^\circ$

Answer : $a = 53^\circ$
$b = 70^\circ$
$c = 40^\circ$

1 Use rule 4 to calculate angles a and b.





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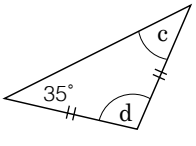
2 Calculate angles c and d.



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3a) e and f together must add to 130° Why?

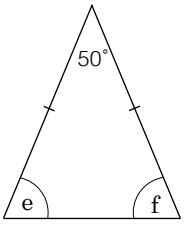
.....

.....

b) e and f are of equal size. Why?

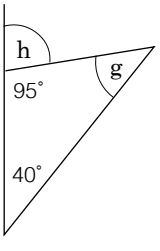
.....

.....



c) Therefore e = ... and f = ...

4



a) Use rule 4 to calculate g.

.....

b) Use rule 1 to calculate h.

.....

A Designing a Questionnaire

To obtain information (data) from people, we can use a **questionnaire**. In a questionnaire we can use open questions, where respondents can fill in whatever they like or we can have tick boxes. Tick boxes make it easier for us to draw up tables and graphs, but it also limits the number of response categories and we could lose interesting information.

For questions with tick boxes we must . . .

- use categories that cover as many possible answers as you can think of,
- inform the respondent how many boxes they are allowed to tick,
- write a simple, clear question, which doesn't hint at your own preference.

Always ask someone who is not involved with your survey to trial your questionnaire. Make improvements as required.

A group of students is planning a statistical project named *Life After School*. They designed a questionnaire and you have been asked to trial it. For part (a) read the question and tick the boxes as instructed. For part (b) suggest possible improvements.

Questionnaire	Possible Questionnaire Improvements

1a) *What sports do you play in your own time?*
(Tick all boxes that apply.)

☐ soccer ☐ rugby ☐ cricket
☐ netball ☐ hockey ☐ volleyball
☐ athletics ☐ swimming ☐ other

1b) .....
.....
.....
.....
.....

2a) *How much time do you spend on homework?*
(Tick one box.)

☐ 2 to 4 hours ☐ 4 to 6 hours
☐ 6 to 8 hours ☐ over 8 hours

2b) .....
.....
.....
.....
.....

3a) *Our teachers don't want us to enjoy ourselves and give too much homework.* (Tick one box.)

☐ strongly agree ☐ agree ☐ disagree

3b) .....
.....
.....
.....

4a) *Do you have a regular part-time job?*

☐ yes ☐ no

4b) .....
.....
.....
.....

5a) *What do you like to do in your free time?*
(Order this list of free time activities from 1 to 6.
1 means you like it best.)

☐ doing physical activities ☐ watching movies / TV ☐ listening to or playing music
☐ hanging out with friends ☐ shopping ☐ play on a computer

5b) .....
.....
.....
.....
.....

A A Formula

If the outcomes of an experiment are equally likely, then the probability of an event is given by this formula :

$$P(\text{event}) = \frac{\text{number of outcomes in the event}}{\text{total number of outcomes}}$$

Examples :

a) How many equally likely outcomes are there when rolling a dice?
b) How many of these outcomes are odd?
c) Calculate the probability that the dice shows an odd number.

Answers :

a) There are six equally likely outcomes : 1, 2, 3, 4, 5, 6.
b) 1, 3 and 5 are odd; three outcomes are odd.
c) $P(\text{odd}) = \frac{3}{6} = \frac{1}{2}$

1 Oliver, Joel and Tristan are playing a board game with one dice.

a) Oliver must roll a six to 'get home'. What is the probability that Oliver rolls a six? $P(6)$ = ...

b) Joel must roll a number greater than 4 to get home.

i) How many outcomes on the dice are greater than 4?

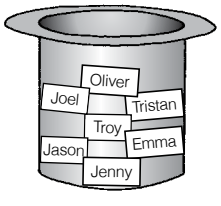
.....

ii) What is the probability that Joel rolls a number greater than 4? $P(\text{greater than 4})$ = ...

c) Tristan's counter needs to make seven steps to get home. What is the probability that Tristan gets 7 in one roll?

$P(7)$ = ...

2 One name is taken at random from the hat.



a) How many equally likely outcomes are there? .....

b) i) How many of the names start with T? .....

ii) Calculate the probability that the name starts with T.

$P(T)$ = ...

c) i) How many outcomes do not start with T? .....

ii) Calculate $P(\text{not T})$ = ...

Calculate these probabilities :

d) $P(J)$ = ... $P(\text{not J})$ = ...

e) $P(E)$ = ... $P(\text{not E})$ = ...

B Card Games

1 One card is drawn at random from this set.

a) How many equally likely outcomes are there? .....

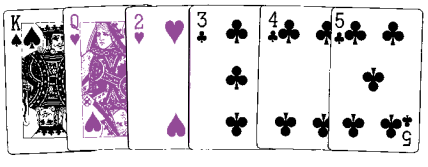
Calculate these probabilities.

b) It is the king. $P(\text{king})$ = ...

c) It is a number. $P(\text{number})$ = ...

d) It is a spade. $P(\spadesuit)$ = ...

2 One card is drawn at random from this set. Calculate these probabilities :



a) It is the queen. $P(\text{queen})$ = ...

b) It is a picture card. $P(\text{picture})$ = ...

c) It is an even number. $P(\text{even})$ = ...

d) It is a club. $P(\clubsuit)$ = ...

e) It is a black suit. $P(\text{black})$ = ...

3 When drawing a card from a full pack of cards, the equally likely outcomes are :

A♠,	K♠,	Q♠,	J♠,	10♠,	9♠,	8♠,	7♠,	6♠,	5♠,	4♠,	3♠,	2♠.
A♥,	K♥,	Q♥,	J♥,	10♥,	9♥,	8♥,	7♥,	6♥,	5♥,	4♥,	3♥,	2♥.
A♦,	K♦,	Q♦,	J♦,	10♦,	9♦,	8♦,	7♦,	6♦,	5♦,	4♦,	3♦,	2♦.
A♣,	K♣,	Q♣,	J♣,	10♣,	9♣,	8♣,	7♣,	6♣,	5♣,	4♣,	3♣,	2♣.

a) How many equally likely outcomes are there? .....

If one card is drawn at random, calculate the probability it's

b) the king of hearts $P(K♥)$ = ...

c) a king $P(K)$ = ...

d) not a king $P(\text{not K})$ = ...

e) a diamond $P(♦)$ = ...