Maths

End of Year Assessments

Revision Notes

Important Websites:

- Mathswatch: https://vle.mathswatch.co.uk/vle/

  You have tasks to complete and videos will help you answer the questions.

- Corbett Maths: https://corbettmaths.com/

  Lots of questions to answer and video clips to help you learn and revise.

- BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/z38pycw

Year 8 Theta:

1	You can work out powers without a calculator. You can multiply two decimals.
2	You can convert between fractions and decimals.
3	You can find the mid-point of a line segment.
4	You can expand a single bracket.
5	You can convert between fractions, decimals and percentages.
6	You can calculate single event probabilities.
7	You can solve problems involving fractions.
8	You can subtract and multiply decimals using the rules of BIDMAS.
9	You can find the highest common factor (HCF) of two numbers.
10	You can translate a shape by a given vector. You can reflect a shape in a linear graph.
11	You can identify angles on parallel lines.
12	You can expand and simplify algebraic expressions. You can factorise into a single bracket.
13	You can solve linear equations.
14	You can find the median from a list of data. You can find the mean of a list of data.
15	You can complete and interpret scatter graphs.

PROMPT sheet

5/1 Multiply & divide by 10, 100, 1000

- By moving the decimal point

To **multiply** by 10 move the dp ONE place RIGHT

e.g. $3.4 \times 10 = 34$

To **divide** by 10 move the dp ONE place LEFT

e.g. $3.4 \times 10 = 0.34$

- By moving the digits

To multiply by 10 move the dp ONE place RIGHT

e.g. 3.52×10

$= 35.2$

5/2 Rounding decimals

- Look at the last number required
- Look at the first number NOT required

e.g. To round 5.47 to 1dp

last number required — 1st number NOT required

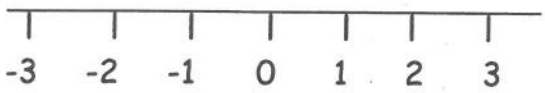
increase this by 1 — Is this 5 or more? YES - delete

e.g. To round 5.43 to 1dp

last number required — 1st number NOT required

leave this alone — Is this 5 or more? NO - delete

5/2 Order negative numbers



$2 > -2$ → We say 2 is bigger than -2

$-1 < 3$ → We say -1 is less than 3

5/3 Number patterns

Look to see how numbers are connected

- Multiples

Multiples of 6 are: 6, 12, 18, 24, 30...

- Factors

Factors of 6 are: 1, 6, 3, 2

- Prime numbers

Prime numbers have only TWO factors

2, 3, 5, 7, 11, 13, 17, 29, 31, 37 .....

- Sequences

1, 4, 9, 16, 25, 36 ... are all square numbers

1, 8, 27, 64, 125 ... are all cube numbers

1, 4, 7, 10, 13, 16 ... increase b 3 each time

5/4 Order fractions and decimals

- Fractions

They must have the same denominator

e.g. $\frac{5}{6}$ $\frac{7}{12}$ $\frac{2}{3}$ $\frac{3}{4}$

↓ ↓ ↓ ↓

$\frac{10}{12}$ $\frac{7}{12}$ $\frac{8}{12}$ $\frac{9}{12}$

Now the fractions can be ordered

- Decimals

Give them all the same number of digits

e.g. 0.3, 0.304, 0.32, 0.33

↓ ↓ ↓ ↓

0.300 0.304 0.320 0.330

Now the decimals can be ordered

5/5 Cancel a fraction to its lowest terms

See what number divides exactly into both the numerator and denominator

e.g. $\frac{8}{12} \xrightarrow[\div 4]{} \frac{2}{3}$

e.g. $\frac{15}{40} \xrightarrow[\div 5]{} \frac{3}{8}$

5/6 Order of operations

Bracket
Indices
Divide } Do these in the order they appear
Multiply }
Add } Do these in the order they appear
Subtract }

e.g. 3 + 4 x 6 - 5 = 22
↑ first

5/7 Fraction of quantity with calculator

- $\frac{4}{5}$ means ÷ 5 x 4

e.g. To find $\frac{4}{5}$ of £40

£40 ÷ 5 x 4 = £40

5/7 Percentage of quantity with calculator

- Change the percentage to a decimal

e.g. 8% of £240
= 0.08 x 240
= £19.20

12 ½ % of 80kg
= 0.125 x 80
= 10kg

80% of 52 litres
= 0.8 x 52
= 41.6 litres

5/8 Multiply by a two digit number

~~Try different methods to find which suits you~~

e.g. 152 x 34 **COLUMN METHOD**

152
34x
608 (x4)
4560 (x30)
5168

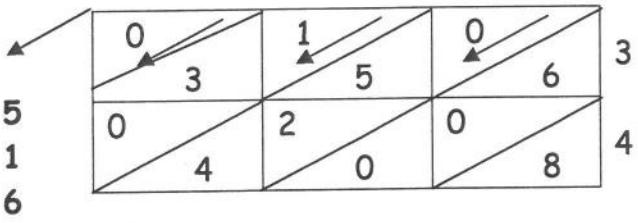
~~e.g. 152 x 34~~ **~~GRID METHOD~~**

	100	50	2
30	3000	1500	60
4	400	200	8

152 x 34 = 3400 + 1700 + 68 = 5168

~~e.g. 152 x 34~~ **~~CHINESE METHOD~~**

1 5 2



5
1
6

8 = 5168

~~e.g. 152 x 34~~ **RUSSIAN METHOD**

Half ↓	Double ↓	
~~152~~	~~34~~	
~~76~~	~~68~~	
~~38~~	~~136~~	
19	272	
9	544	
~~4~~	~~1088~~	
~~2~~	~~2176~~	
1	4352	

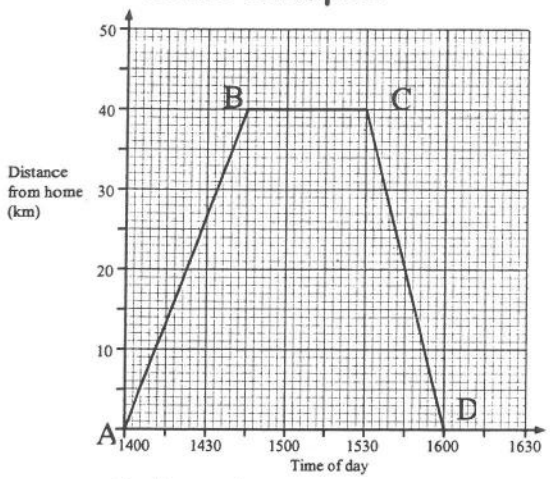
Cross out left hand side even numbers

Add what is left
272 + 544 + 4352 = 5168

5/8 Divide by a two digit number

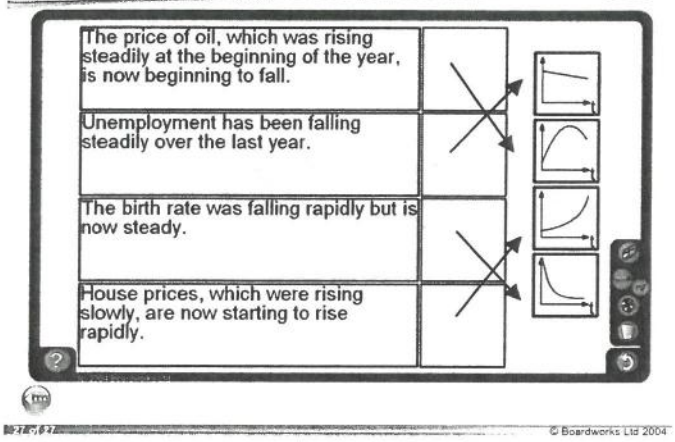
6/10&11 Real life graphs

Some examples

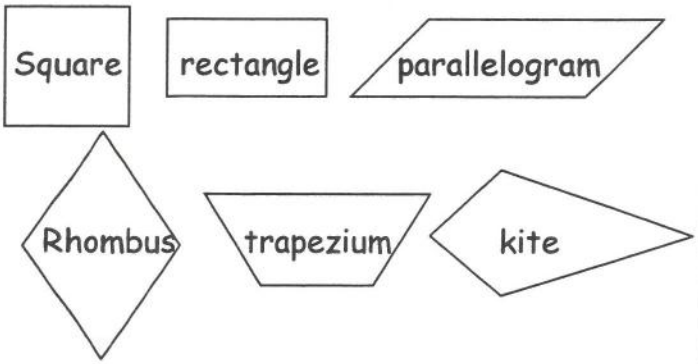


- AB shows the journey away
- BC shows no movement
- CD shows journey back
- The steeper the line the higher the speed

Matching graphs to statements



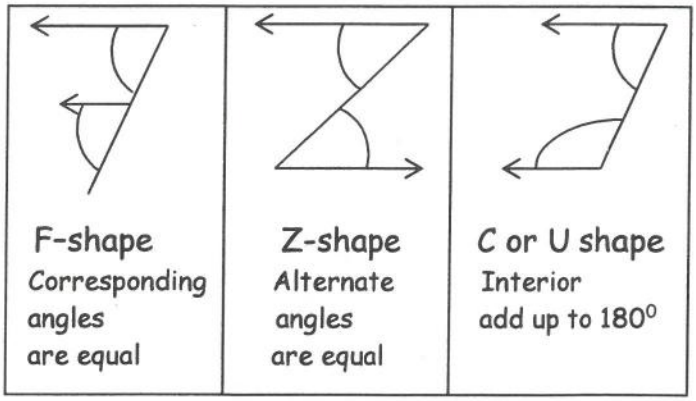
6/12 Quadrilaterals & their properties



- Know the name of each quadrilateral
- Does it have line and/or rotational symmetry?
- Are the diagonals equal or bisect each other?
- Does it have parallel sides?
- Are angles equal or opposites equal?

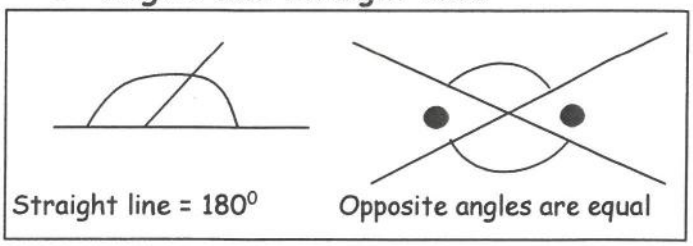
6/13&14&15 Angles

- Angles & parallel lines



F-shape	Z-shape	C or U shape
Corresponding angles are equal	Alternate angles are equal	Interior add up to 180^0

- Angles and straight lines



Straight line = 180^0 Opposite angles are equal

- Angles of polygons

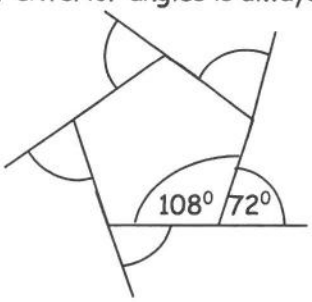
~Polygons have straight sides

~Polygons are named by the number sides

3 sides - triangle
4 sides - quadrilateral
5 sides - pentagon
6 sides - hexagon
7 sides - heptagon
8 sides - octagon
9 sides - nonagon
10 sides - decagon

~With ALL sides equal they are called REGULAR

~ Sum of exterior angles is always 360^0



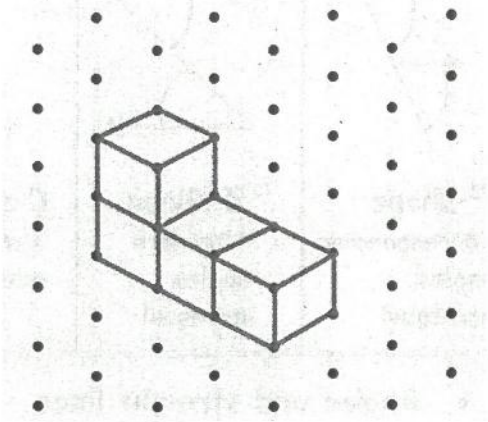
~ the interior & exterior angle add up to 180^0

~ the interior angles add up to:

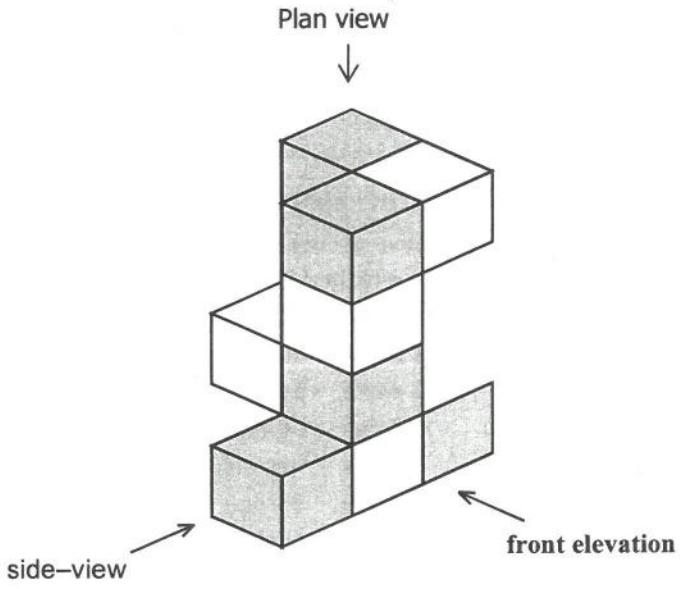
Triangle = $1 \times 180^0 = 180^0$
Quadrialteral = $2 \times 180^0 = 360^0$
Pentagon = $3 \times 180^0 = 540^0$
Hexagon = $4 \times 180^0 = 720^0$ etc

6/16 2D representations of 3D shapes

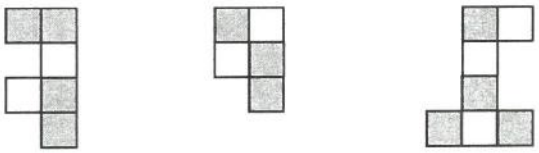
- 3D drawing on isometric paper
  (notice NO horizontal lines)



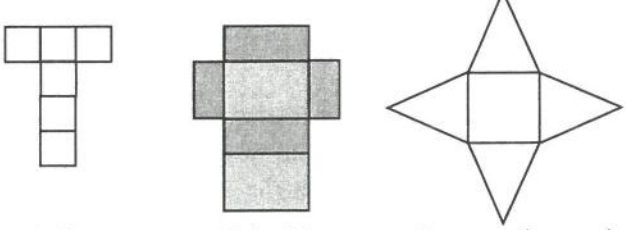
- 3 views of a 3D shape



Side view | Plan view | Front elevation



- Nets

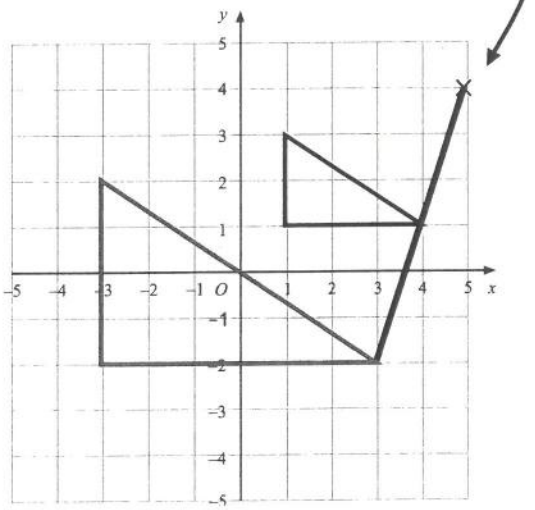


Cube | Cuboid | Square based pyramid

6/17 Enlarge a shape

You need to know:

- Centre e.g. (5, 4)
- Scale factor e.g. 2

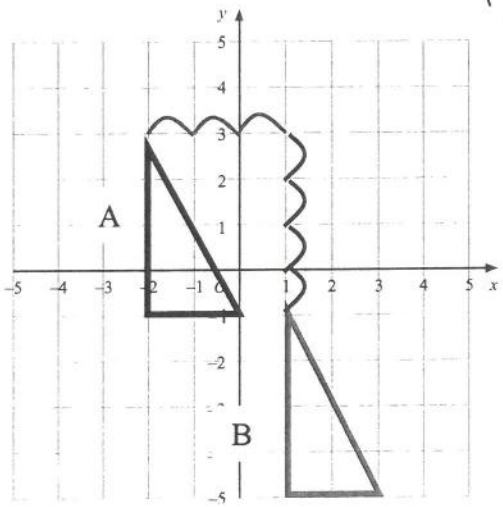


6/18 Translate & Reflect a shape

- Translate a shape

You need to know:

- Vector from A to B e.g. $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$ Right / Down



Notice:

- The new shape stays the same way up
- The new shape is the same size

USE TRACING PAPER TO HELP

PROMPT sheet

6/1 Equivalent fractions, decimals & percentages

- Percentage to decimal to fraction

$27\% = 0.27 = \frac{27}{100}$

$7\% = 0.07 = \frac{7}{100}$

$70\% = 0.7 = \frac{70}{100} = \frac{7}{10}$

- Decimal to percentage to fraction

$0.3 = 30\% = \frac{3}{10}$

$0.03 = 3\% = \frac{3}{100}$

$0.39 = 39\% = \frac{39}{100}$

- Fraction to decimal to percentage

$\frac{4}{5} = \frac{80}{100} = 80\% = 0.8$

Change to 100

$\frac{3}{8} = 3 \div 8 = 0.375 = 37.5\%$

6/2 Increase/Decrease by a percentage

- To increase £12 by 5%

= 1.05 x £12 ***(100% + 5% = 105%)***

OR

= £12 + 5% of £12

- To decrease £50 by 15%

= 0.85 x £50 ***(100% - 15% = 85%)***

OR

= £50 – 15% of £50

6/3 Divide a quantity into a given ratio

~ Put headings

~Find how many shares in total

~ Amount ÷ no. shares = value of one share

e.g. Divide £240 between A and B in ratio of 3:5

A : B

3 : 5 = 8 shares

One share = £240 ÷ 8 = £30

A = 3 shares = 3 x £30 = £90

B = 5 shares = 5 x £30 = £150

6/4 Use proportional reasoning

- Change an amount in proportion

e.g. If 6 books cost £22.50

Find the cost of 11. *(find cost of 1 first)*

- Change amounts to compare

e.g. A pack of 5 pens cost £6.10

A pack of 8 pens cost £9.20

Which is the best buy? *(find cost of 40 of each)*

6/5 Calculate with fractions

- Add & subtract fractions

~Make the denominators the same

e.g. $\frac{1}{5} + \frac{7}{10}$

$= \frac{2}{10} + \frac{7}{10}$

$= \frac{9}{10}$

$\frac{4}{5} - \frac{10}{15}$

$= \frac{12}{15} - \frac{10}{15}$

$= \frac{2}{15}$

- Multiply fractions

~Write 7 as $\frac{7}{1}$

~Multiply numerators & denominators

e.g. $5 \times \frac{2}{3}$

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

$= \frac{10}{3} = 3\frac{1}{3}$

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

$= \frac{8}{15}$

- Divide fractions

~Write 7 as $\frac{7}{1}$

~Flip numerator & denominator after ÷

~Multiply numerators & denominators

e.g. $5 \div \frac{2}{3}$	$\frac{4}{5} \div \frac{2}{3}$
$= \frac{5}{1} \times \frac{3}{2}$	$= \frac{4}{5} \times \frac{3}{2}$
$= \frac{15}{2} = 7\frac{1}{2}$	$= \frac{12}{10} = 1\frac{2}{10} = 1\frac{1}{5}$

- Calculate fraction of quantity

To find $\frac{4}{5}$ of a quantity ÷ 5 x 4

e.g. $\frac{4}{5}$ of £20 = 20 ÷ 5 x 4 = £16

6/6 Solve an equation by trial & improvement method

~ Find 2 consecutive numbers that the solution lies between

~ Then choose the half way number

~ Keep making improvements until the required accuracy achieved

e.g. To solve $x^3 - 3x = 6$ (correct to 1dp)

Try x =	$x^3 - 3x$	Comment
2	$2^3 - 2x2=4$	Too small
3	$3^3 - 3x3=28$	Too big
2.5	$2.5^3 - 3x2.5=8.125$	Too big
2.3	$2.3^3 - 3x2.3=5.267$	Too small
2.4	$2.4^3 - 3x2.4=6.624$	Too big
2.35	$2.35^3 - 3x2.35=5.928$	Too small

Solution is nearer 2.4 than 2.3

So x = 2.4 (correct to 1dp)

6/7 Solve linear equations

~Multiply out brackets first

~If there are letters on both sides get rid of the smaller first

~Do the same to both sides

e.g.

To solve $5(x - 3) = 3x + 7$ (expand bracket)

$5x - 15 = 3x + 7$ (-3x from both sides)

$2x - 15 = + 7$ (+15 to each side)

$\frac{2x}{2} = \frac{22}{2}$ (÷2 both sides)

$x = 11$

6/8 Sequences

- Understand position and term

Position	1	2	3	4
Term	3	7	11	15

+4

Term to term rule = +4

Position to term rule is x 4 - 1

(because position 1 x 4 - 1 = 3)

nth term = n x 4 -1 = 4n - 1

- Generate terms of a sequence

If the nth term is 5n + 1

1st term *(n=1)* = 5x1 + 1 = 6

2nd term *(n=2)* = 5x2 + 1= 11

3rd term *(n=3)* = 5x3 + 1 = 16

6/9 Plot graphs of linear equations

~Substitute values of x into the equation

~Plot the points in pencil

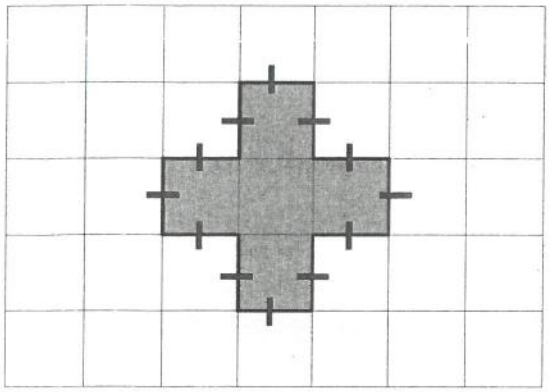
~Join the points with a ruler and pencil

~They should be in a straight line

e.g. y = 3x - 1

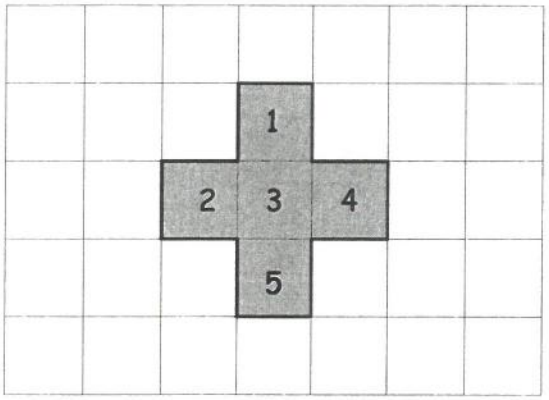
x	-2	-1	0	1	2
y	-7	-4	-1	2	5

4/18 Find perimeter of simple shapes



- **Perimeter** is round the **OUTSIDE**

Perimeter of this shape = 12cm



- **Area** is the number of squares **INSIDE**

Area of this shape = 5cm^2

4/19 Record using a frequency table

Score on dice	Tally	Frequency
1	𝍸 𝍸	10
2	IIII	4
3	𝍸 I	6
4	III	3
5	𝍸 III	8
6	I	1

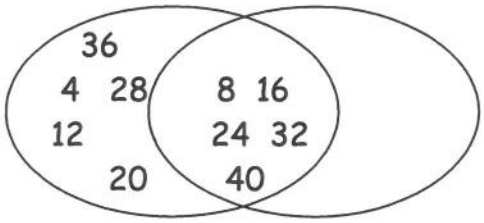
4/19 Record using a grouped frequency table

Weight(w)	Tally	Frequency
$15 \leq w < 20$		
$20 \leq w < 25$		
$25 \leq w < 30$		
$30 \leq w < 35$		
$35 \leq w < 40$		

4/20 Use a Venn Diagram

- To place these numbers onto a Venn diagram

4 8 12 16 20 24 28 32 36 40



Multiples of 4 Multiples of 8

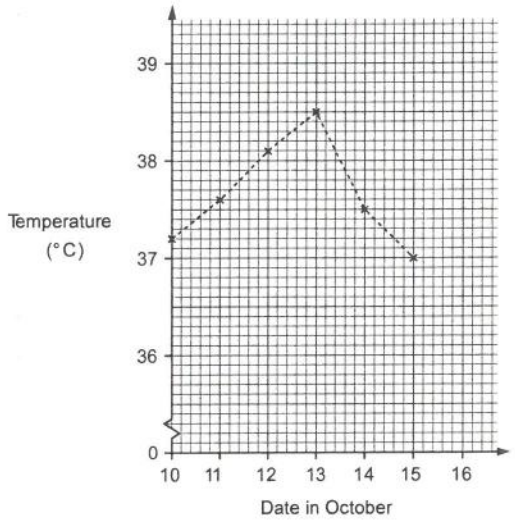
- To place these numbers onto a Carroll diagram

25 27 14 47 36 37 67
64 16 9 11

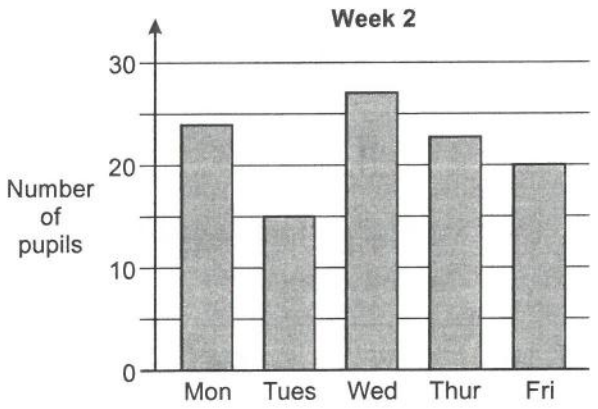
	Square number	Not a square number
Odd number of factors	9 16 25 36 64	
Even number of factors		11 14 27 47 37 67

4/21 Construct/interpret graphs

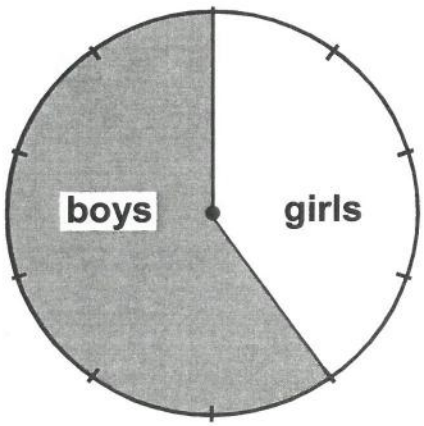
- Line graph - temperature



- Bar graph - Number of pupils at a youth club



- Pie chart - Number of pupils in the yard



4/22 Mode and Range

- Mode is the most frequent measure
- Range is highest minus lowest measure

4/23 Language of probability

- Probability words are used to describe how likely it is that an event will happen.

Examples of probability words are

- **certain**
- **likely**
- **even chance**
- **unlikely**
- **impossible**

Other words:

- **Equally likely** - when all outcomes have the same chance of occurring
- **Biased** - when all outcomes do NOT have the same chance of occurring

6/23 Presentation of data

- Construct a pie chart

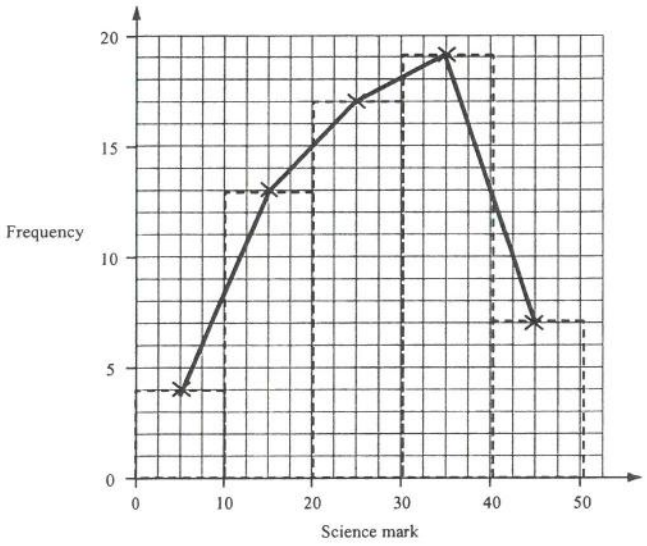
Transport	Frequency	Angle
Car	13 x 9	117^0
Bus	4 x 9	36^0
Walk	15 x 9	135
Cycle	8 x 9	72

Total frequency = 40

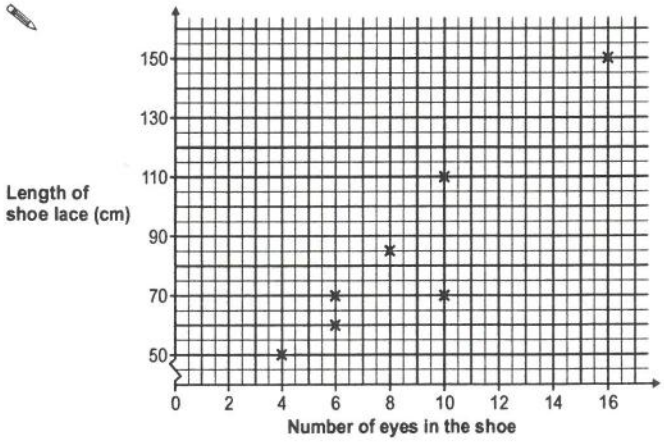
$360^0 \div 40 = 9^0$ per person

- Construct a frequency polygon

(points plotted at the midpoint of the bars)



- Construct a scatter graph



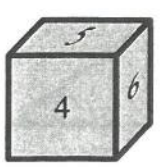
6/24 Find all possible outcomes

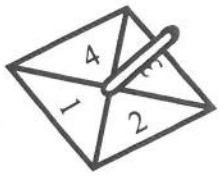
Outcomes can be presented:

- In a list
- In a table or sample space

Example of a sample space

To show all possible outcomes from spinning a spinner and rolling a dice





		Dice					
	+	1	2	3	4	5	6
Spinner	1	2	3	4	5	6	7
	2	3					
	3	4					
	4	5					

6/25 Sum of mutually exclusive outcomes =1

- If 2 outcomes cannot occur together, They are mutually exclusive
- If 2 outcomes A and B are mutually exclusive
  P(A) + p(B) = 1
- If 3 outcomes A B and C are mutually exclusive
  P(A) + p(B) + p(C) = 1

e.g. If outcomes A, B and C are mutually exclusive and

p(A) = 0.47

p(B) = 0.31

p(C) = 1 - (0.47 + 0.31)

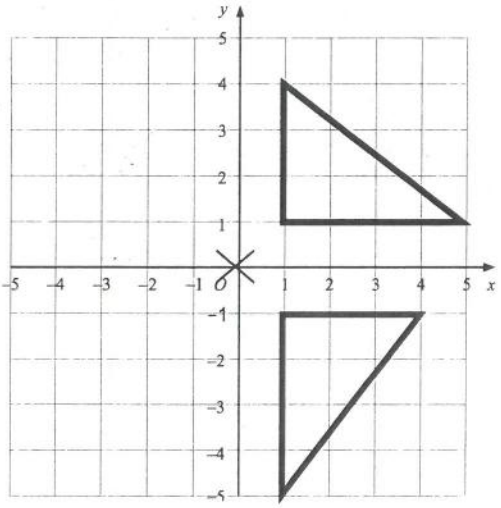
= 1 - 0.78

= 0.22

- Reflect a shape

You need to know:

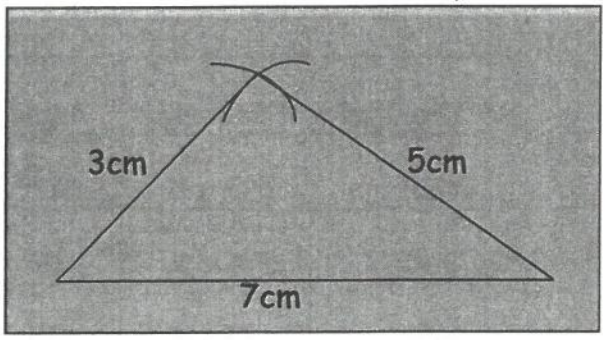
- **Angle e.g. 90^0**
- **Direction e.g. clockwise**
- **Centre of rotation e.g.(0,0)**



USE TRACING PAPER TO HELP

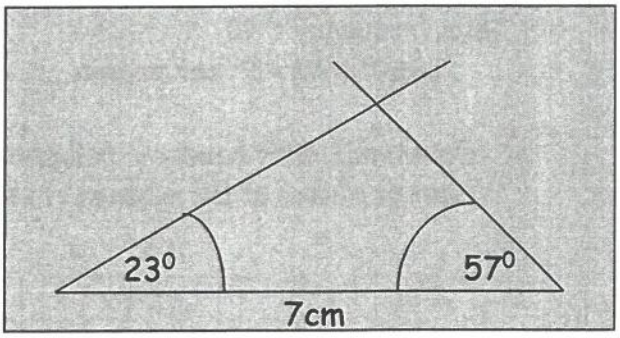
- Construct triangle given 3 sides

(Use a pair of compasses
Leave the arcs on)



- Construct triangle given angles

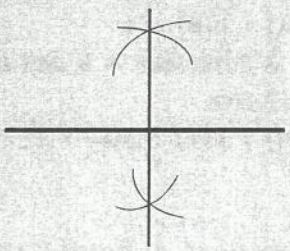
(Use a protractor)



6/19 Constructions

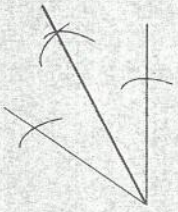
- Perpendicular bisector of a line

Draw a straight line through where the arcs cross above and below.



- Bisector of a line

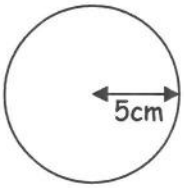
Draw a line from where the arcs cross to the vertex of the angle



6/20 Use formulae

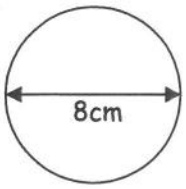
- Area of circle

Area of circle = $\pi \times r^2$
= $\pi \times r^2$
= $\pi \times 5^2$
= $\underline{78.5cm^2}$



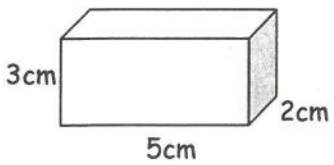
- Circumference of circle

Area of circle = $\pi \times d$
= $\pi \times 8$
= 25.1cm



- Volume of cuboid

Volume = l x w x h
= 5 x 3 x 2
= 30cm^3



- Surface area of cuboid

Front = 5x3 = 15
Back = 5x3 = 15
Top = 5x2 = 10
Bottom = 5x2 = 10
Side = 3x2 = 6
Side = 3x2 = 6

Total Surface Area =62cm^2