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 7 Delta End of Year Assessment:

1	You can add negative numbers.
2	You can interpret bar charts.
3	You can apply the rules of BIDMAS.
4	You can find the terms of a linear sequence.
5	You can find cube roots without a calculator.
6	You can form algebraic expressions.
7	You can simplify algebraic expressions.
8	You can factorise algebraic expressions. You can solve linear equations.
9	You can solve linear equations. You can expand a single bracket.
10	You can subtract fractions.
11	You can find square roots without a calculator. You can find a fraction of an amount. You can find a percentage of an amount.
12	You can convert between fractions and decimals.
13	You can solve fraction problems.
14	You can solve problems involving averages.
15	You can plot a linear graph.
16	You can solve ratio problems without a calculator.
17	You can solve problems involving the volume and surface area of prisms.

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

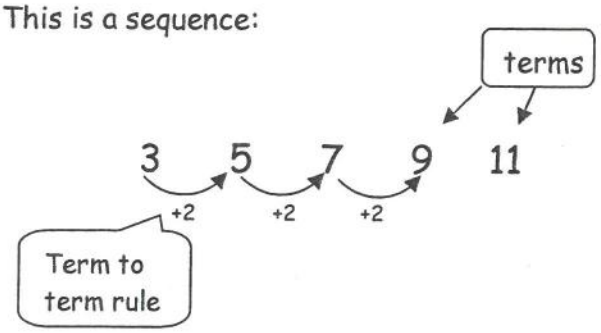
PROMPT sheet

4/1 Number Patterns

- A list of numbers with a pattern is called a SEQUENCE
- The numbers are called TERMS
- A 'TERM TO TERM RULE' tells you how to get from one term to the next

It might be add, subtract, multiply or divide by something

This is a sequence:



4/2 Multiples, factors & square numbers

- FACTORS are what divides exactly into a number

e.g. Factors of 12 are:

1	12
2	6
3	4

- MULTIPLES are the times table answers

e.g. Multiples of 5 are:

5 10 15 20 25 .....

- SQUARES are the result of multiplying a number by itself

e.g. 1 x 1 = 1
2 x 2 = 4
3 x 3 = 9

Square numbers

4/3 Multiply & Divide by 10 or 100

- To multiply by 10, move each digit one place to the left

e.g. 35.6 x 10 = 356

Hundreds	Tens	Units	•	tenths
	3	5	•	6
3	5	6	•	

- To divide by 10, move each digit one place to the right

e.g. 35.6 ÷ 10 = 356= 3.56

Tens	Units	•	tenths	hundredths
3	5	•	6	
	3	•	5	6

- To multiply by 100, move each digit 2 places to the left
- To divide by 100, move each digit 2 places to the right

4/3 Multiply & Divide by 10 or 100

AN ALTERNATIVE METHOD

Instead of moving the digits

Move the decimal point the opposite way

4/4 Fraction, decimal, percentage equivalents

LEARN THESE:

$\frac{1}{4} = 0.25 = 25\%$

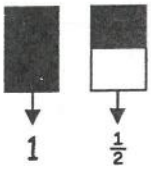
$\frac{1}{2} = 0.5 = 50\%$

$\frac{3}{4} = 0.75 = 75\%$

4/5 Convert mixed numbers to improper fractions & vv

- An improper fraction is top heavy & can be changed into a mixed number

$\frac{3}{2}$ can be shown in a diagram



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

Improper fraction — Mixed number

- A mixed number can be changed back into an improper fraction

$$1\overset{+1}{\underset{\times 2}{}}\frac{1}{2} = \frac{3}{2}$$

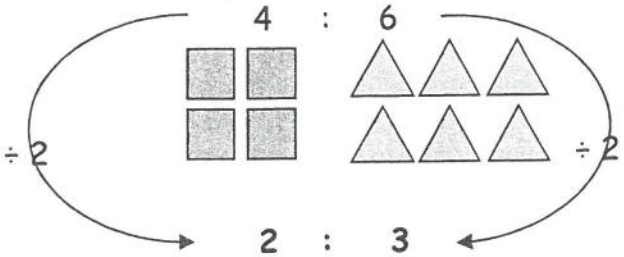
$$2\overset{+3}{\underset{\times 4}{}}\frac{3}{4} = \frac{11}{4}$$

4/6 Simple ratio

The ratio of squares to triangles can be written

squares : triangles

4 : 6



2 : 3

Ratios can be simplified just like fractions

4/7 Use inverse operations

- To undo ADD, just SUBTRACT

e.g. 36 + 23 = 59 (59 - 36 = 23)

- To undo MULTIPLY, just DIVIDE

e.g. 7 × 3 = 21 (21 ÷ 7 = 3)

- Use balancing:

20 + □ = 20 × 4

20 + □ = 80

20 + 60 = 80 (80- 20 = 60)

4/8 Brackets in calculations

A calculation must be done in the correct order

1. Brackets
2. Indices, Division and Multiplication
3. Addition and Subtraction

Using this order I get 3 different answers:

3 + 6 × 5 - 1 = 32

(3 + 6) × 5 - 1 = 44

3 + 6 × (5 - 1) = 27

It all depends on where the bracket is

4/9 Times tables up to 10x10

It is important to know the times tables and the division facts that go with them

Example

9 × 7 = 63

63 ÷ 9 = 7

63 ÷ 7 = 9

4/11 Coordinates in first quadrant

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

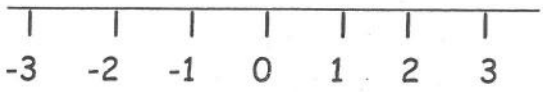
increase this by 1 — Is this 5 or more? YES - delete

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

$12\frac{1}{2}$ % 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

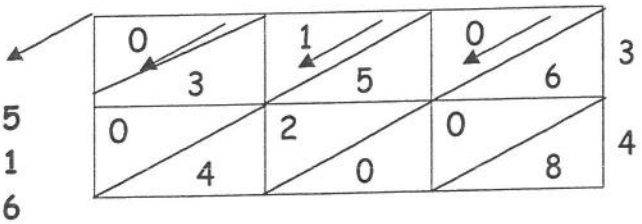
e.g. 152 x 34 **GRID METHOD**

	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



= 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

Try different methods to find which suits you

e.g. 4928 ÷ 32 **BUS SHELTER METHOD**

- Divide
- Multiply
- Subtract
- Bring down - Make a new number
- Divide ...

```
   0 1 5 4
32)4 9 2 8
  -3 2 ↓
   1 7 2
  -1 6 0 ↓
     1 2 8
    -1 2 8
       0 0 0
```

4928 ÷ 32 = 154

---

e.g. 4928 ÷ 32 **CHUNKING METHOD**

4928	
3200	100 X 32
1728	
1600	50 X 32
128	
128	4 X 32

4928 ÷ 32 = 154

---

e.g. 4928 ÷ 32 **SHORT DIVISION METHOD**

(Except write down some of your tables down first)

32
64
96
128
160

```
   0 1  5 4
32)4⁴9¹⁷2 ¹²8
```

4928 ÷ 32 = 154

Remember the rules:

- When subtracting go down the number line
- When adding go up the number line

- 8 + - 2 is the same as 8 – 2 = 6
- 8 - + 2 is the same as 8 – 2 = 6
- 8 - - 2 is the same as 8 + 2 = 10

5/10 Ratio

- How it is written

Yellow : Red
= 2 : 6

- How it can be simplified

Yellow : Red
= 1 : 3

- Simplify by cancelling

Examples

$2^{\div 2} : 6^{\div 2} = 1 : 3$
$10^{\div 5} : 15^{\div 5} = 2 : 3$

5/10 Direct proportion

e.g.1
5 miles is approximately 8km.
How many miles are equal to 24km?
24km ÷ 8km = 3
5 miles x 3 = 15 miles

e.g.2
It takes 90 Lego bricks to build 3 planes

How many bricks would be needed for 11?

1 plane uses 90 ÷ 3 = 30 bricks
~~**11 planes will use 11 x 30 = 330 bricks**~~

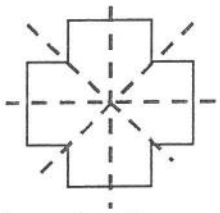
5/9 Negative numbers

~~5/12&13 Properties of 2D & 3D shapes~~

Symmetries

- Order of Line Symmetry

this is the number of times a shape can be folded so that one side falls exactly onto the other side



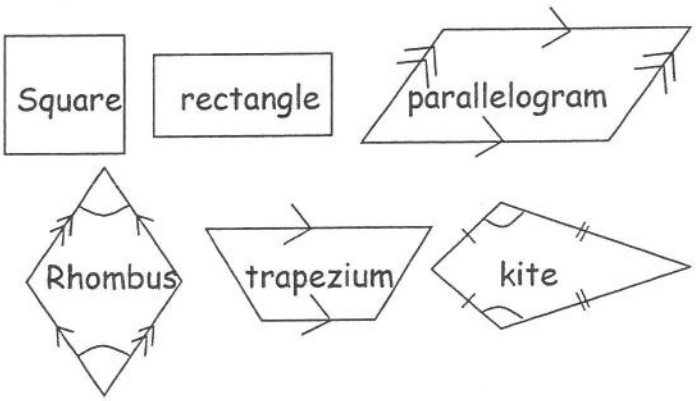
This shape has line symmetry ORDER 4

- Order of Rotational Symmetry

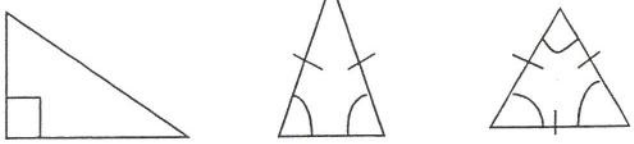
this is the number of times a shape falls into its outline in one complete turn

A parallelogram has rotational symmetry order 2

Names of shapes – Quadrilaterals

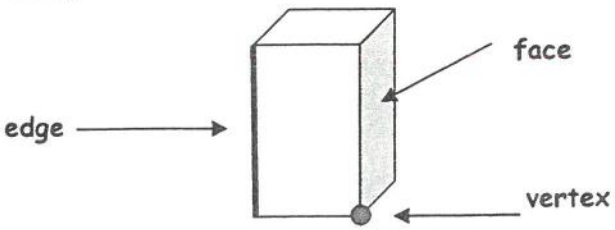


Names of shapes - Triangles



Right angled **Isosceles** **Equilateral**

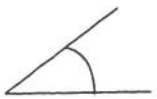
3D shape



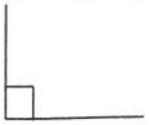
5/14 Angles

- Types of angles

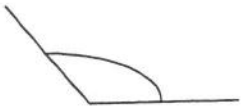
Acute (less than 90^0)



Right (Exactly 90^0)



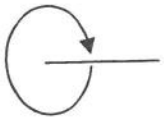
Obtuse (Between 90^0 & 180^0)



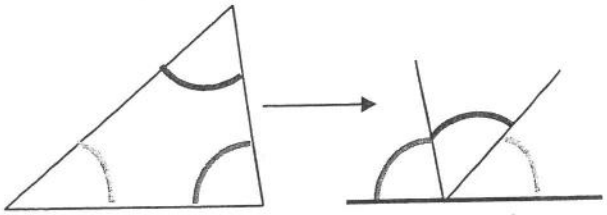
Straight line (180^0)

Reflex (Between 180^0 & 360^0)

Complete turn (360^0)



- Angles of a triangle

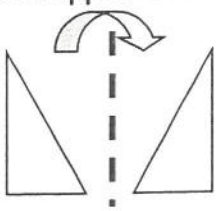


Angles of a triangle add up to 180^0

5/15 Transform Shapes

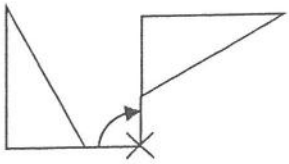
- Reflection

A shape flipped over a line



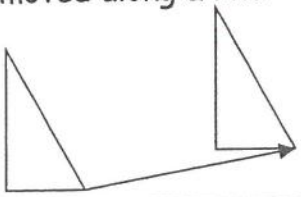
- Rotation

A shape turned round a point



- Translation

A shape moved along a line

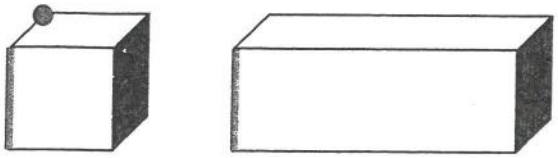


5/16 Measure and draw angles

PRISMS- same cross section through length

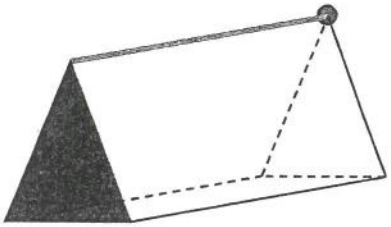
Cube and cuboid

- 6 faces
- 12 edges
- 8 vertices



Triangular prism

- 5 faces
- 9 edges
- 6 vertices

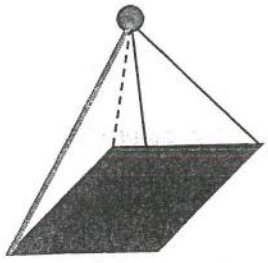


Cylinder – special prism

PYRAMIDS- a point opposite the base

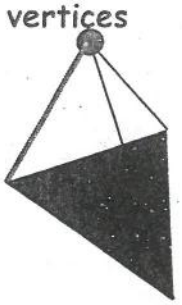
Pyramid – square based

- 5 faces
- 8 edges
- 5 vertices



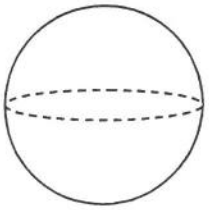
Pyramid – triangular based

- 4 faces
- 6 edges
- 4 vertices



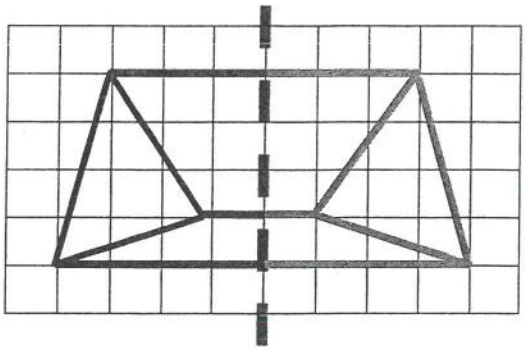
Cone – special pyramid

SPHERES- ball shape

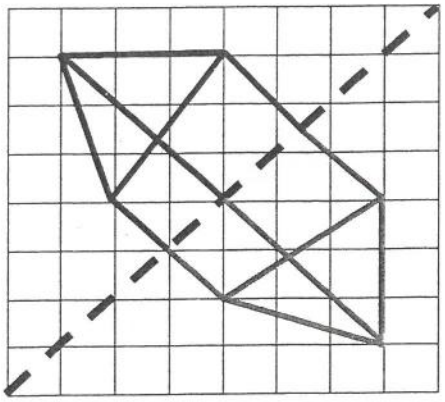


4/15 Reflect in a mirror line

- To reflect a shape in a vertical line



- To reflect a shape in a 45^0 line



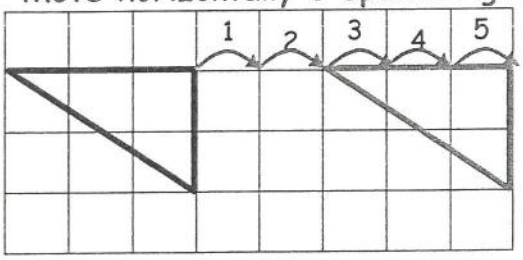
Distances from shape to mirror and mirror to reflection must be same

Tracing paper is useful:

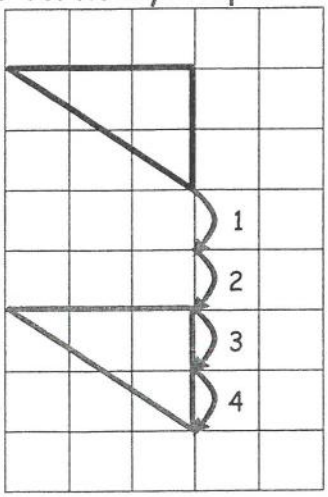
1. Trace the shape & the mirror line
2. Flip the tracing paper over the mirror line
3. Redraw the shape in its new position

4/16 Translate a shape

- Move horizontally 5 spaces right

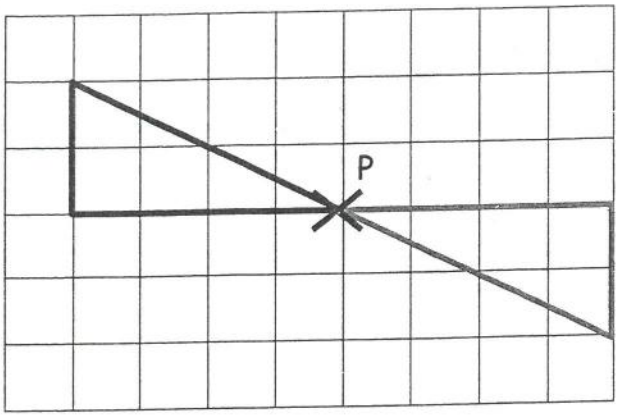


- Move vertically 4 spaces down



4/16 Rotate a shape

- To rotate a shape 180^0 about P



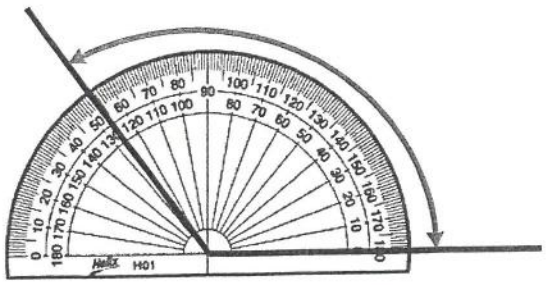
Tracing paper is useful:

1. Trace the shape
2. Hold the shape down with a pencil
3. Rotate tracing paper
4. Redraw the shape in its new position

4/17 Use a ruler accurately

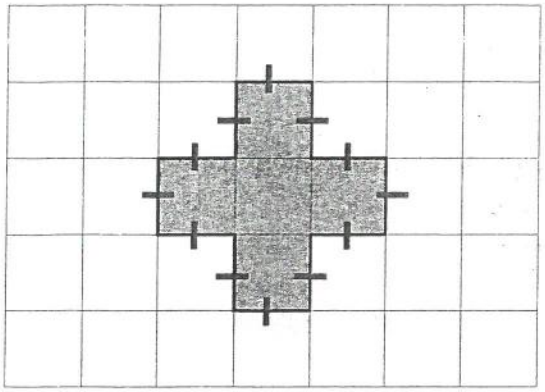
Measure from 0
This line is 14.7cm long

Use a protractor accurately



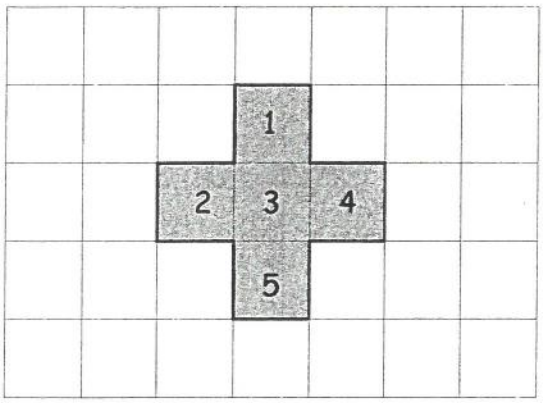
Count the number of degrees between the 2 arms of the angle. This angle is 127^0

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

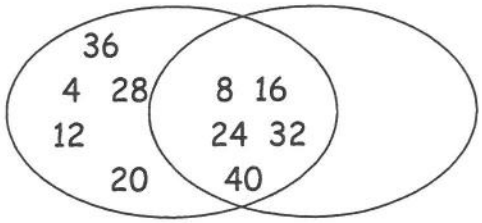
4/19 Record using a grouped frequency table

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



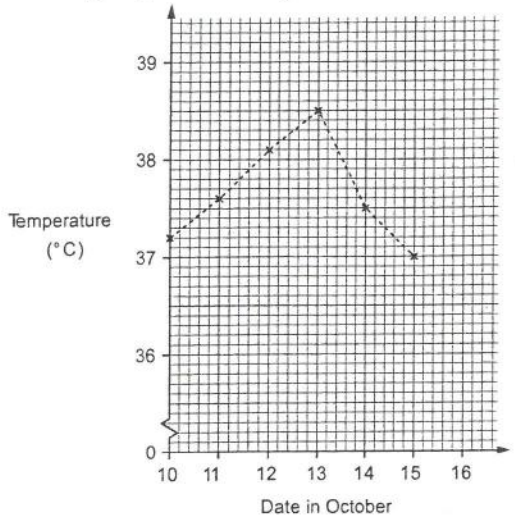
- To place these numbers onto a Carroll diagram

25 27 14 47 36 37 67
64 16 9 11

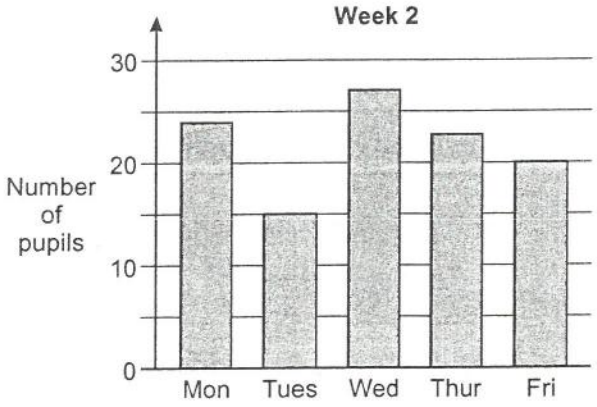
	Square number	Not a square number
Odd number of factors	9 16 25 36 64	
Even number of factors		11 14 27 47 37 67

4/21 Construct/interpret graphs

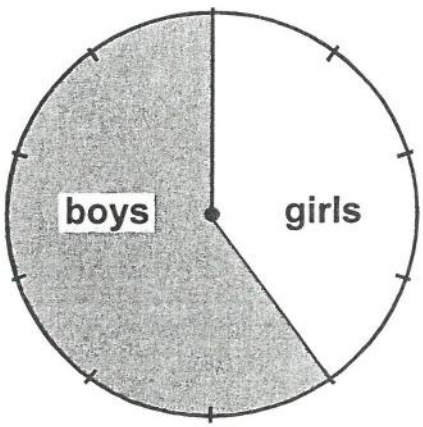
- Line graph - temperature



- 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