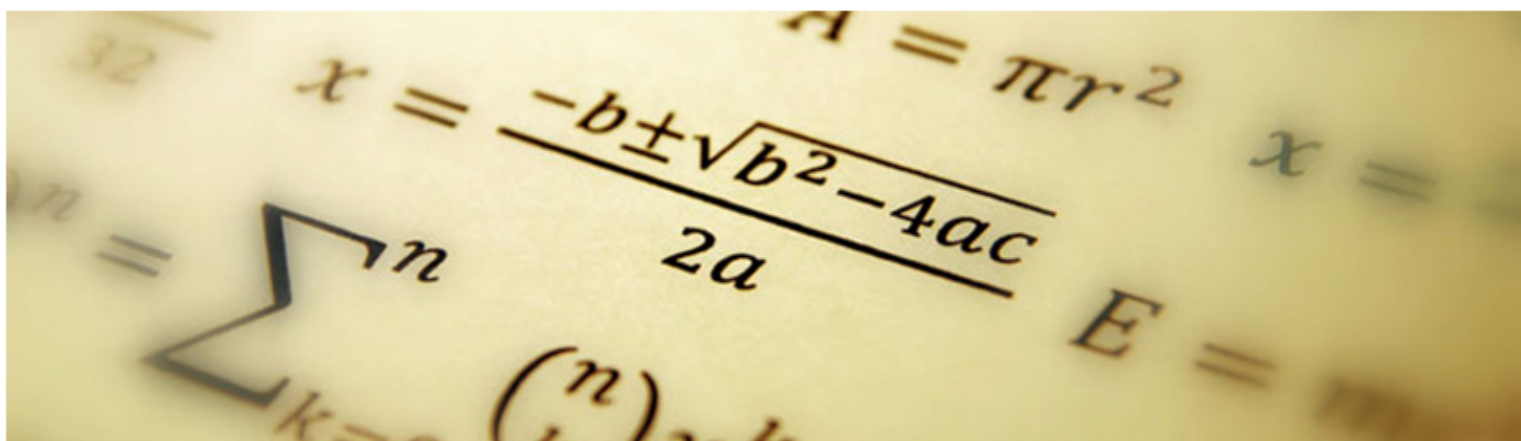




# Knowledge Organiser *Maths*

**Year 11 Term 1 High**



# Year 11 High Term 1 Overview

## Number

Laws of indices (fractional and negative, overlap to algebra)	HCF and LCM, Product of primes	Estimates
Standard form	Surds	Bounds

## Algebra

Solving linear equations & Deriving equations from words	Solve linear simultaneous equations	Factorise and solve quadratics	Algebra shape problems	nth term	Sketching straight line graphs	Sketching quadratic and cubic graphs	Solve simultaneous equations graphically	Solve linear Inequalities	Real-life graphs
Rearrange formulae	Solve non-linear simultaneous equations	Factorise quadratics $a > 1$	Simplify & solve algebraic fractions	Quadratic nth term & Geometric progression	$y = mx + c$	Parallel and perpendicular equations	Transformations of graphs	Represent inequalities graphically	Tangents to circles

## Geometry, Shape and Measures

3D Pythagoras and SOH CAH TOA	Non-right angle trigonometry	Area and circumference of circles	Area problems
Non-right angle trigonometry	Trig graphs	Area and perimeter of sectors	Volume and surface area of prisms, pyramids and spheres

## Useful Websites—Resources, Past Papers, Video Tutorials and Solutions

- ♦ <https://corbettmaths.com/contents/>
- ♦ <https://vle.mathswatch.co.uk/vle/>  
 USERNAME: namesurname@dustonschool  
 PASSWORD: berrywood
- ♦ <https://www.methodmaths.com/>  
 CENTRE ID: duston  
 USERNAME: namesurname@dustonschool    PASSWORD: berrywood

# Term 1 Homework 1 High

Use the websites suggested on the overview page to help complete these questions.

Your teacher will let you know when this homework is due. You will go over how to complete these together in class and then you have a go at the next homework which has similar questions.

This will increase your success in these topics in the Summer.

1) Solve  $3x + y = 1$   
 $x - 2y = 19$

Mathswatch clip 162

2) (i)  $(4 \times 10^3) \times (3 \times 10^2)$

(ii)  $(6 \times 10^5) \div (2 \times 10^{-2})$

Mathswatch clip 83

3) Evaluate  $64^{\frac{1}{3}}$

Mathswatch clip 188

4) Factorise  $3x^2 + 5x - 12$

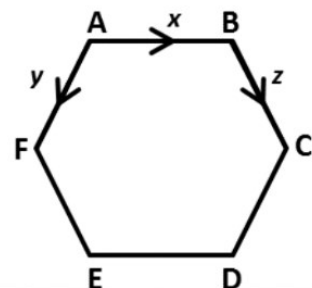
Mathswatch clip 192

5) Solve  $3x^2 + 5x + 1 = 0$

*Find both solutions correct to 2 decimal places*

Mathswatch clip 191

6) Write the vector  $\overrightarrow{BF}$  in terms of  $x$  and  $y$



Mathswatch clip 219

7) Convert this decimal to a fraction

$0.\dot{2}\dot{6}$

- 11) In 2010, there were 85 rabbits in the local park.  
The population increased by 12% each year.  
How many rabbits will in the park in 2018?

Mathswatch clip 164

- 12) X is directly proportional to  $Y^3$   
When  $Y = 2$  and  $X = 160$   
Find a formula for X in terms of Y

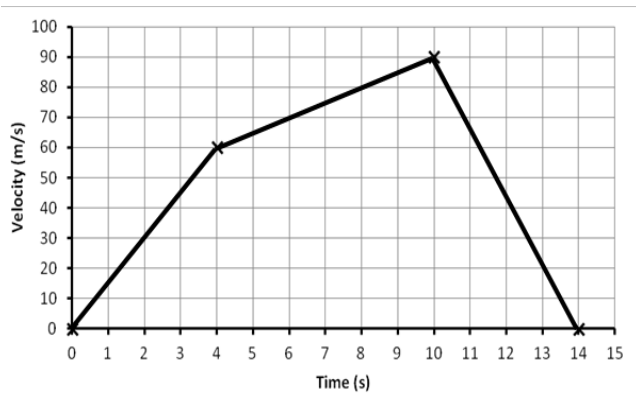
Mathswatch clip 177

- 8) Work out the equation of the perpendicular line to  $y=2x+1$  that passes through the point (4, 9)

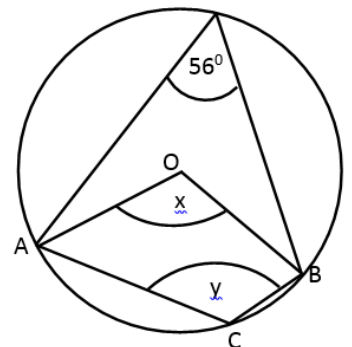
Mathswatch clip 199

Mathswatch clip 208

- 9) Work out the distance travelled



- 13) Work out x and y



Mathswatch clip 183

- 14)

In a box of chocolates there are 5 toffees and 4 creams.  
Two chocolates are chosen at random from the box.  
Work out the probability of choosing **two the same**.

Mathswatch clip 216a

- 10)

Calculate the nth term of the following sequence:

5, 8, 13, 20, 29, ....

Mathswatch clip 213

Mathswatch clip 175/204

## Term 1 Homework 2 High

Use the websites suggested on the overview page to help complete these questions.

Your teacher will let you know when this homework is due. You will go over how to complete these together in class and then you have a go at the next homework which has similar questions.

This will increase your success in these topics in the Summer.

1) **Solve**  $3x + 2y = 12$   
 $4x - y = 5$

Mathswatch clip 162

2a)  $-(4 \times 10^3) + (3 \times 10^2)$

B)  $(8.04 \times 10^3) - (3.85 \times 10^3)$

Mathswatch clip 83

3) **Evaluate**  $9^{\frac{3}{2}}$

Mathswatch clip 188

4) **Factorise**  $3x^2 - 13x + 4$

Mathswatch clip 192

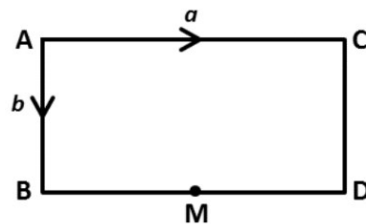
5) **Solve**  $x^2 + 2x - 2 = 0$

*Find both solutions correct to  
2 decimal places*

Mathswatch clip 191

6) M is the midpoint of BD

6) Write the vector  $\overrightarrow{AM}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$



Mathswatch clip 219

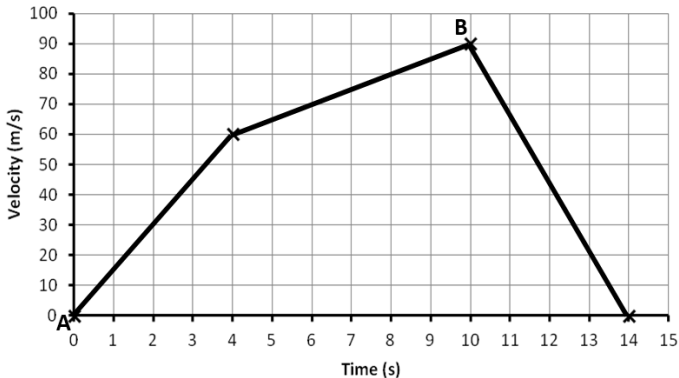
7) Convert this decimal to a fraction      $0.0\dot{4}\dot{2}$

Mathswatch clip 177

8) Work out the equation of the perpendicular line to  $y=2x + 3$  that passes through the point (4, 7)

Mathswatch clip 208

9) Work out the distance travelled between A and B



Mathswatch clip 216a

10) Calculate the  $n$ th term of the following sequence:  
1, 5, 11, 19, 29, ....

Mathswatch clip 213

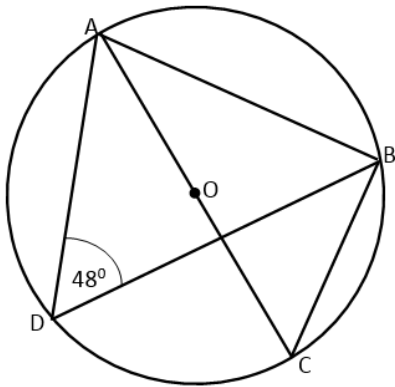
11) An adult takes 400 mg of pain relief. Each hour, the amount of pain relief in the person's system decreases by about 29%. How much pain relief is left after 6 hours?

Mathswatch clip 164

12) X is inversely proportional to Y  
When  $Y = 12$  and  $X = 8$   
Find a formula for X in terms of Y  
Find the value of X when  $Y = 6$

Mathswatch clip 199

13) O is the centre



(i) Work out the size of  $\angle ABC$  with reason

Mathswatch clip 183

14) In a cafe there is a choice of: 2 starters, 3 mains and 2 desserts. How many different combinations for a starter, main and dessert are there in total?

Mathswatch clip 175/204

## Term 1 Homework 3 High

Use the websites suggested on the overview page to help complete these questions.

Your teacher will let you know when this homework is due. You will go over how to complete these together in class and then you have a go at the next homework which has similar questions.

This will increase your success in these topics in the Summer.

1) Solve 
$$\begin{aligned} 2x + 4y &= -2 \\ 3x + 5y &= -1 \end{aligned}$$

Mathswatch clip 162

2a)  $(5.2 \times 10^3) \times (5 \times 10^6)$   
answer in standard form

B)  $(8 \times 10^3) \div (2 \times 10^{-4})$   
answer in standard form

Mathswatch clip 83

3) Evaluate  $4^{-\frac{1}{2}}$

Mathswatch clip 188

4) Factorise  $4x^2 + 21x + 5$

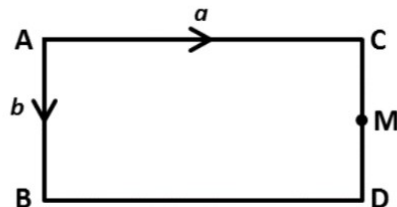
Mathswatch clip 192

5) Solve  $2x^2 + 4x - 5 = 0$

*Find both solutions correct to  
2 decimal places*

Mathswatch clip 191

- 6) M is the midpoint of CD  
N is the midpoint of BD  
Write down the vector  $\overrightarrow{MN}$



Mathswatch clip 219

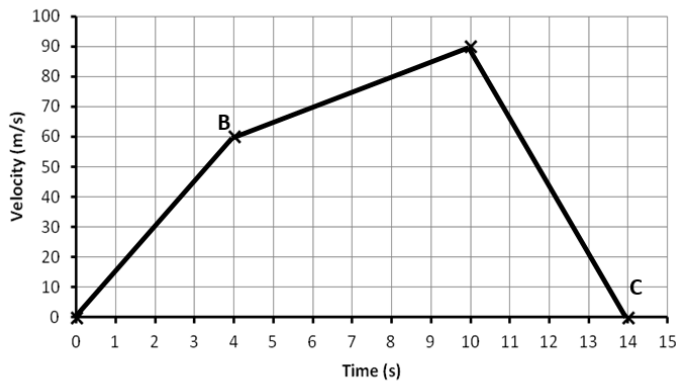
7) Convert this decimal to a fraction  $0.4\dot{1}\dot{2}$

Mathswatch clip 177

8) Work out the equation of the perpendicular line to  $y = 5 - \frac{1}{2}x$  that passes through the point (4, 11)

Mathswatch clip 208

9) Work out the distance travelled between B and C



Mathswatch clip 216a

10) Calculate the  $n$ th term of the following sequence:  
-2, 1, 6, 13, 22, ....

Mathswatch clip 213

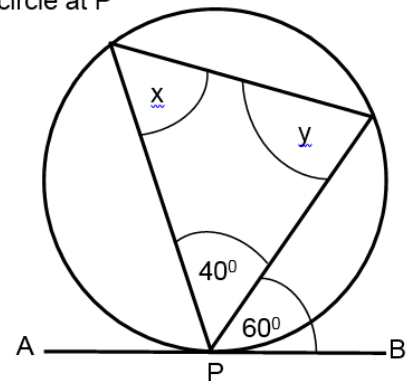
11) A town's population is 24 000. The projected growth in population is 8% per annum over the next 4 years. What is the increased population likely to be in 4 years time?

Mathswatch clip 164

12)  $W$  is directly proportional to  $L$   
When  $L = 25$  and  $W = 6$   
Find a formula for  $W$  in terms of  $L$   
Find the value of  $W$  when  $L = 30$

Mathswatch clip 199

13)  $AB$  is a tangent to the circle at  $P$



i) Work out the size of **angle x** with reason

Mathswatch clip 183

14) A photograph 4cm wide has an area of  $21\text{cm}^2$ .  
A similar photograph has an area of  $189\text{cm}^2$   
What is the width of the larger photograph?

Mathswatch clip 175/204