# THE DUSTING School Knowledge Organiser Maths Year 11 Term 3 High

Name:	Class:
Homework	Due date
- In 2a	52-4ac E
$-k = \binom{n}{2}$	

### Year 11 High Term 2 Overview

#### <u>Number</u>

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

#### <u>Algebra</u>

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
Rearrange formulae	Solve nonlinear simultaneous equations	Factorise quadratics a>1	Simplify & solve algebraic	Quadratic nth term & Geometric	y=mx+c	Parallel and perpendicular equations

#### Shape and data

Area problems		Compound measures	Stem and leaf & Scatter graphs	Cumulative frequency and box plots	Pie charts & Sampling	Probability & relative frequency	Sample space diagrams
Volume of frustums & problem solving	Vectors	Velocity-time graphs	Averages from tables & Frequency polygons	Histograms	Time Series	Probability trees	Set theory (with Venn diagrams)

#### Ratio and proportion

Simplify/scale up/divide ratio	Recipes and best value	Exchange rates	Calculating with fractions	Percentages of amounts, increasing and
Tricky ratio problems	Tricky ratio problems	Direct & inverse proportion	Exponential & other non-linear graphs	Compound interest & Reverse percentages

#### 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: firstnamesurname PASSWORD: berrywood

## Solving Quadratic Inequalities

L1S1

Solve each quadratic inequality.

1) 
$$-x^2 - 5x + 6 > 0$$
 2)  $-x^2 - 12x - 11 \le 0$ 

3) 
$$x^2 - 1 < 0$$
 4)  $x^2 - 2x - 3 \ge 0$ 

5) 
$$x^2 + 4x - 5 > 0$$
 6)  $x^2 - 5x - 6 < 0$ 

7) 
$$-x^2 + 3x + 10 \le 0$$
  
8)  $x^2 + 8x - 9 \ge 0$ 

#### On each grid, y = f(x) is drawn. Sketch the graph of the transformation indicated.



uare de la comparte d	$3x^{2} + 12x + 7$ can be written in the form $a(x + b)^{2} + c$ where $a, b$ and $c$ are constants.			b) Using your answer to part (a) solve $3x^2 + 12x + 7 = 7$		Gold 🗙
Completing the Sq	The point $(-2, -3)$ is the turning point of $y = x^2 + ax + b$ , where $a$ and $b$ are integers. Find the values of $a$ and $b$ .		Silver 🔆	$x^{2} + 10x - 8 = (x + p)^{2} - q$ where <i>p</i> and <i>q</i> are constants. a) Find the values of <i>p</i> and <i>q</i> .	b) Hence Solve $x^2 + 10x - 8 = 0$	Silver 🔆
	Express the following expressions in the form $(x + a)^2 + b$ , where <i>a</i> and <i>b</i> are constants. <i>a)</i> $x^2 + 4x + 9$	b) $x^2 + 8x - 12$	Bronze ★	a) Write down the coordinates of the turning point of the graph $y = x^2 - 6x + 4$ .	Cmuminim or o muminum o idt of 14	



Find the equation of the tangent passing through the following points on the circles below:

- a)  $x^2 + y^2 = 17$  at the point (4, -1)
- b)  $x^2 + y^2 = 164$  at the point (8, 10)
- c)  $x^2 + y^2 = 80$  at the point (-4, -8)

#### Advanced simultaneous equations

Question 2: Solve the following simultaneous equations

(a)	$\mathbf{x} + \mathbf{y} = 4$	<b>(</b> b <b>)</b>	x + y = 7	(c)	$x^2 + y^2 = 13$
	$y = x^2 + 3x - 1$		xy = 10		x + y = 5

(d) 
$$2x^2 + y^2 = 10$$
  
 $2x - y = 5$ 
(e)  $y = x^2 + x - 7$   
 $4x + 2y + 1 = 0$ 
(f)  $y = x - 2$   
 $2x^2 - xy = 11$ 

