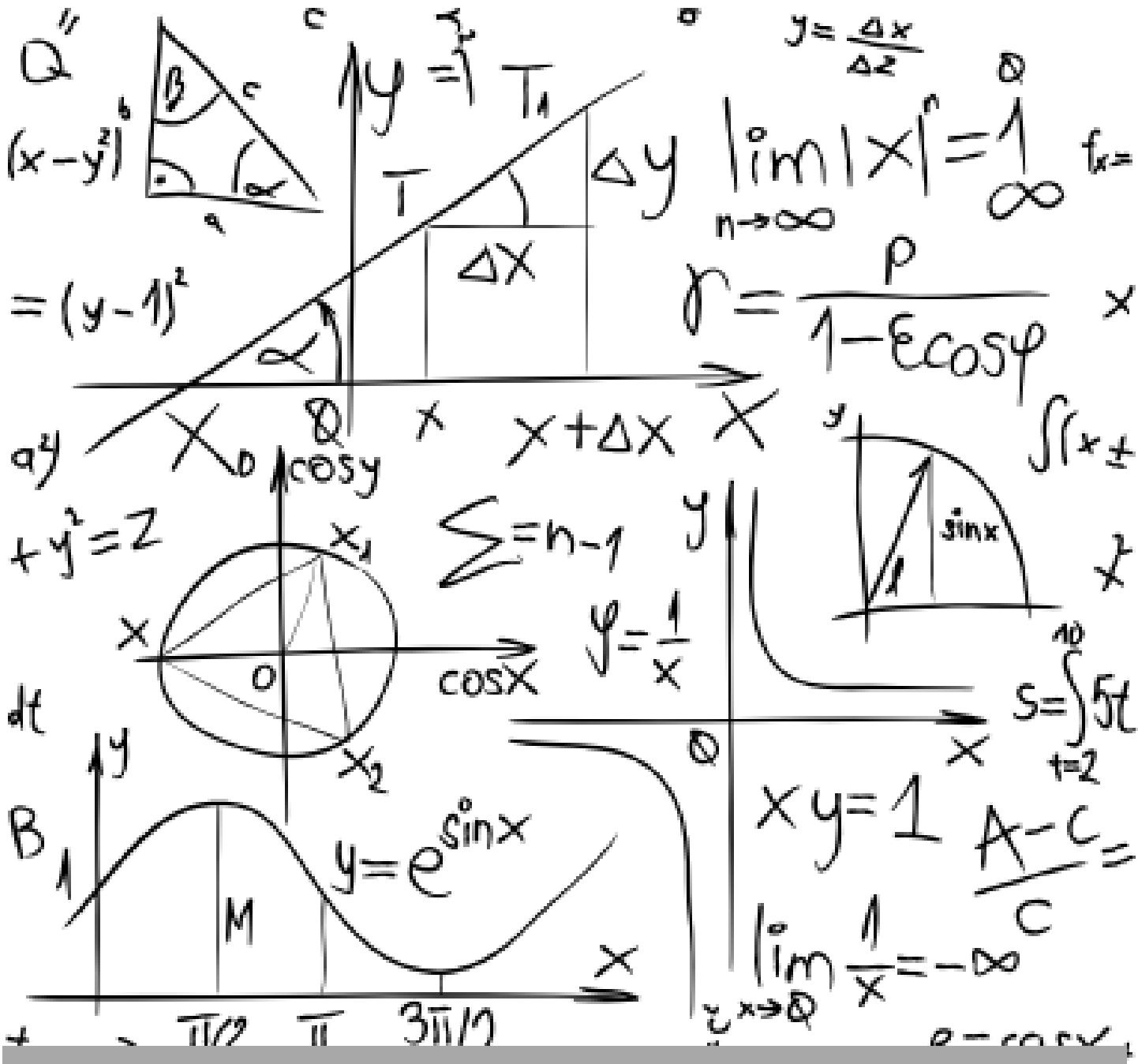

A - LEVEL MATHS TRANSITION WORK 1

DUE: THE FIRST MATHEMATICS LESSON IN SEPTEMBER

NAME _____ MARK _____

This summer work is **compulsory**.

You are expected to submit this homework in during the first Mathematics lesson after the summer holidays. In the new academic year you will sit a test as part of the transition period. The test will focus on many of the skills included in this booklet. The knowledge and skills assessed in this booklet, and on the induction test, are required for success in A-Level Mathematics. Therefore, it is essential that you are confident in all the skills included in this booklet.

Success in A-Level Mathematics relies on an excellent attitude to learning and commitment to your studies. If you are struggling with any of the content in this book, you must use the video links included to brush up on these key skills. The videos stated are accessible on www.vle.mathswatch.com (if you are a Ripley student) OR www.corbettmaths.com (for everyone).

You are expected to write neatly, show the method clearly.
Diagrams should be drawn using a pencil and ruler.

Content

LAWS OF INDICES

MathsWatch Clip No: 82, 154, 188

Corbett Maths: 173, 174, 176

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1. (a) Simplify $m^5 \div m^3$

.....

(b) Simplify $5x^4y^3 \times x^2y$

.....

2. Write these numbers in order of size.
Start with the smallest number.

5^{-1} 0.5 -5 5^0

.....

3. Write down the value of $125^{\frac{2}{3}}$

.....

4. (a) Find the value of 5^0

.....

(b) Find the value of $27^{1/3}$

.....

(c) Find the value of 2^{-3}

.....

5. (a) Write down the value of $64^{\frac{1}{2}}$

.....

(b) Find the value of $\left(\frac{8}{125}\right)^{-\frac{2}{3}}$

.....

SURDS

MathsWatch Clip No: 207 (All)

Corbett Maths: 305 - 308

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1. Write $\frac{\sqrt{18}+10}{\sqrt{2}}$ in the form $a+b\sqrt{2}$ where *a* and *b* are integers.

.....

2. (a) Rationalise the denominator of $\frac{1}{\sqrt{3}}$

.....

(b) Expand $(2+\sqrt{3})(1+\sqrt{3})$
Give your answer in the form $a+b\sqrt{3}$ where *a* and *b* are integers.

.....

3. Work out
$\frac{(5+\sqrt{3})(5-\sqrt{3})}{\sqrt{22}}$
Give your answer in its simplest form.

.....

3. (a) Rationalise the denominator of $\frac{1}{\sqrt{7}}$

.....

(b) (i) Expand and simplify $(\sqrt{3} + \sqrt{15})^2$
Give your answer in the form $a + b\sqrt{3}$ where *a* and *b* are integers.

.....

(ii) All measurements on the triangle are in centimetres.
ABC is a right-angled triangle.
k is a positive integer.

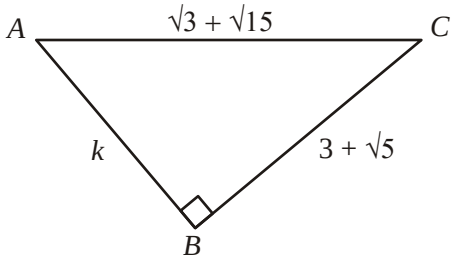

Diagram **NOT** accurately drawn

Find the value of *k*.

k = ...

CHANGING THE SUBJECT FOR A FORMULA

MathsWatch Clip No: 136, 190

Corbett Maths: 7, 8

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1. Make u the subject of the formula

$$D = ut + kt^2$$

u = ...

2. Rearrange $a(q - c) = d$ to make q the subject.

q = ...

3. Make x the subject of

$$5(x - 3) = y(4 - 3x)$$

x = ...

4. Rearrange the formula to make a the subject.

$$P = \frac{n^2 + a}{n + a}$$

a =.....

SIMULTANEOUS EQUATIONS (LINEAR AND NON-LINEAR)

MathsWatch Clip No: 140, 162, 211

Corbett Maths: 295 - 298

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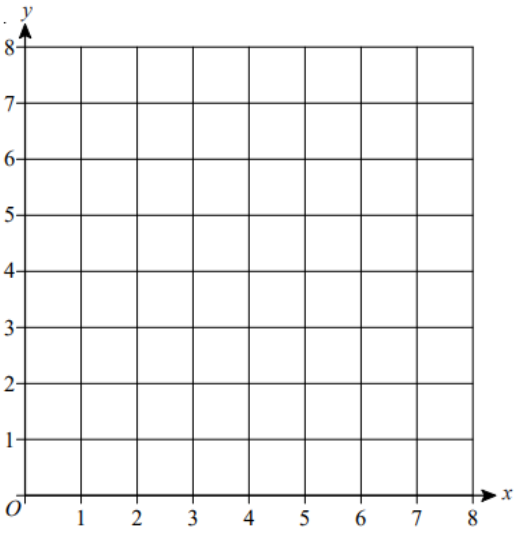
1. Use the axes provided to solve the simultaneous equations.

$y = 2x - 1$ and $y = 7 - x$



2. Solve the simultaneous equations

(a) $3x + 4y = 5$
$2x - 3y = 9$

(b) $2x + 3y = \frac{2}{3}$

$3x - 4y = 18$

$x =$ ……..

$y =$ ……..

$x =$ ……..

$y =$ ……..

3. Solve the equations

$$x^2 + y^2 = 36$$
$$x = 2y + 6$$

$x =$ ……

$y =$ ……

4. Solve the equations

$$x + y = 4$$
$$y = x^2 + 3x - 1$$

$x =$ ……

$y =$ ……

EXPANDING AND FACTORISING QUADRATIC EXPRESSIONS/EQUATIONS

MathsWatch Clip No: 94, 157, 192

Corbett Maths: 118, 119, 119a

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1. Expand and simplify $(m + 7)(m + 3)$

.....

2. (a) Factorise $6 + 9x$

.....

(b) Factorise $y^2 - 16$

.....

(c) Factorise $2p^2 - p - 10$

.....

3. (a) Factorise $x^2 + 5x + 4$

.....

(b) Expand and simplify $(3x - 1)(2x + 5)$

.....

4. (a) Factorise $x^2 + 7x$

.....

(b) Factorise $y^2 - 10y + 16$

.....

(c) (i) Factorise $2t^2 + 5t + 2$

.....

5. Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$

.....

USING THE QUADRATIC FORMULA

MathsWatch Clip No: 191

Corbett Maths: 267

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1. Solve $3x^2 + 7x - 13 = 0$
Give your solutions correct to 2 decimal places.

$x =$ ..... or $x =$ .....

2. Solve the equation

$$2x^2 + 6x - 95 = 0$$

Give your solutions correct to 3 significant figures.

$x =$ ..... or $x =$ .....

3. Solve this quadratic equation.

$$x^2 = 5x + 8$$

Give your answers correct to 3 significant figures.

$x =$ ..... or $x =$ .....

COMPLETING THE SQUARE

MathsWatch Clip No: 209 (All)

Corbett Maths: 267a, 265

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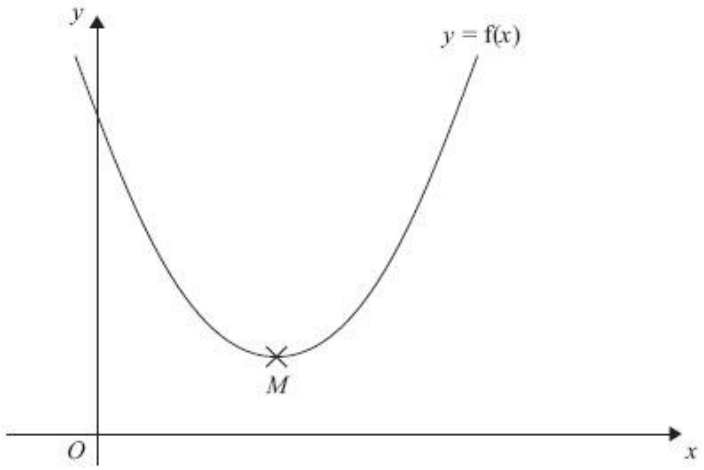
1. The expression $x^2 - 8x + 21$ can be written in the form $(x + a)^2 + b$ for all values of x.
   (a) Find the value of a and the value of b.

a = ...

b = ...

The equation of a curve is $y = f(x)$ where $f(x) = x^2 - 8x + 21$
The diagram shows part of a sketch of the graph of $y = f(x)$.



The minimum point of the curve is M.
(b) Write down the coordinates of M.

.....

2. Sketch the graph of $f(x) = x^2 - 5x + 10$, showing the coordinates of the turning point and the coordinates of any intercepts with the coordinate axes.

3. (a) Write $2x^2 + 16x + 35$ in the form $a(x + b)^2 + c$ where a, b, and c are integers.

.....

(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = 2x^2 + 16x + 35$

.....

INEQUALTIES

MathsWatch Clip No: 138, 198

Corbett Maths: 178, 179, 182

A. Find the range of values of x that is satisfied by the following inequalities below. You must show your working out.

(1) solve $8x - 3 \geq 9$

(2) solve $5(3x - 2) \leq 125$

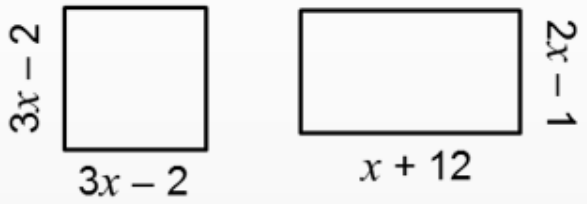
(3) solve $\frac{2x - 3}{5} > 9$

(4) solve $\frac{3}{8}(5x + 1) \leq 66$

(5) solve $-7 \leq 5x + 3 \leq 23$

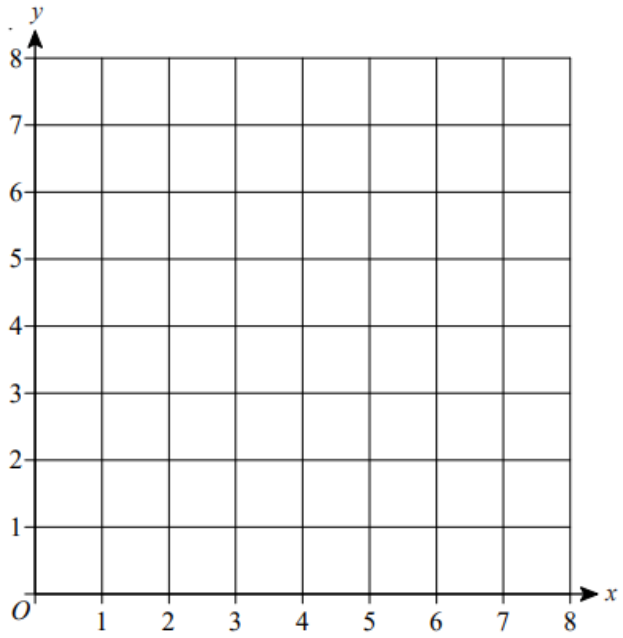
(6) solve $1 \leq 6 - 5x \leq 41$

B. for what values of x is the perimeter of the square greater than the perimeter of the rectangle?



C. On the axes provided, draw straight lines, and use shading, to show the region R that satisfies the inequalities detailed.

$$y \geq x + 1$$
$$y \geq 5$$
$$x \geq 1$$



D. On the axes provided, draw straight lines, and use shading, to show the region R that satisfies the inequalities detailed.

$$y \geq x$$
$$x + y \leq 7$$
$$x \geq 1$$