Write your name here

Surname	Other names

In the style of:

Edexcel GCSE

Centre Number	Candidate Number

Mathematics A

Quadratic Equations

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference
1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators must not be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

1. Simplify fully $\dfrac{6x^2 + x - 1}{4x^2 - 1}$

$$= \frac{(3x - 1)(2x + 1)}{(2x + 1)(2x - 1)}$$

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

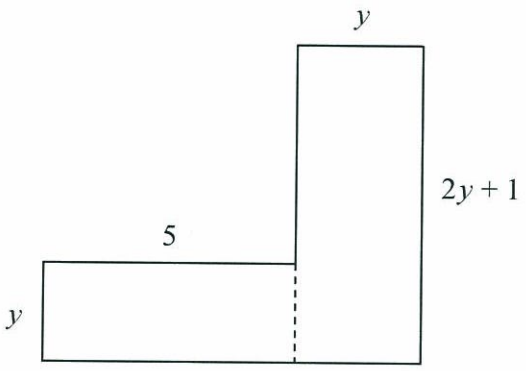
$\dfrac{3x - 1}{2x - 1}$

.....

(Total 4 marks)

2. The diagram below shows a 6-sided shape.
All the corners are right angles.
All the measurements are given in centimetres.

Diagram **NOT** accurately drawn



The area of the shape is 95 cm^2.

(a) Show that $2y^2 + 6y - 95 = 0$

$5y + y(2y+1) = 95$

$\Rightarrow 5y + 2y^2 + y = 95$

$\Rightarrow 2y^2 + 6y - 95 = 0$

(3)

(b) Solve the equation

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

Give your solutions correct to 3 significant figures.

$y = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \dfrac{-6 \pm \sqrt{6^2 - 4(2)(-95)}}{2(2)}$

$= \dfrac{-6 \pm \sqrt{796}}{4} = 5.55$ or -8.55 (3 s.f.).

$y =$ 5.55 or $y =$ −8.55

(3)

(Total 6 marks)

3. Simplify fully $\dfrac{x^2-8x+15}{2x^2-7x-15}$ $= \dfrac{(x-5)(x-3)}{(2x+3)(x-5)} = \dfrac{x-3}{2x+3}$

$\dfrac{x-3}{2x+3}$

.....

(Total 3 marks)

4. (a) Rearrange this equation

$$\frac{5}{x+2} = \frac{4-3x}{x-1}$$

to give $3x^2 + 7x - 13 = 0$

N.B: $\frac{a}{b} = \frac{c}{d} \Rightarrow ad = bc$

$5(x-1) = (x+2)(4-3x)$

$\Rightarrow 5x - 5 = 4x - 3x^2 + 8 - 6x$

$\Rightarrow 3x^2 + 7x - 13 = 0$

(3)

(b) Solve $3x^2 + 7x - 13 = 0$
correct to 2 decimal places.

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{-7 \pm \sqrt{7^2-4(3)(-13)}}{2(3)}$

$= \frac{-7 \pm \sqrt{205}}{6} = 1.22 \text{ or } -3.55 \text{ (2d.p.)}.$

$x =$ 1.22 or $x =$ -3.55

(3)

(Total 6 marks)

5. (a) Expand and simplify $(x + 3)(x - 2)$

$x^2 - 2x + 3x - 6$

$= x^2 + x - 6$

$x^2 + x - 6$

(2)

(b) Factorise $x^2 + 7x + 10$

$(x + 5)(x + 2)$

$(x + 5)(x + 2)$

(2)

(c) $x = 3y + 4(z - y)$

Find the value of x when $y = 6$ and $z = 5$

$x = 3(6) + 4(5 - 6)$

$= 18 + 4(-1)$

$= 14$

$x = 14$

(3)

(Total 7 marks)

6. (a) Factorise $x^2 - 7x + 10$

$(x - 5)(x - 2)$

$(x-5)(x-2)$

(2)

(b) Solve $x^2 - 7x + 10 = 0$ $\Rightarrow x - 5 = 0$

or $x - 2 = 0$

$\Rightarrow x = 5$ or $x = 2$

$x =$ 5

or $x =$ 2

(1)

(Total 3 marks)

7. (a) Simplify $4a + 3c - 2a + c$

$2a + 4c$

(1)

(b) $S = \frac{1}{2}at^2$

Find the value of S when $t = 3$ and $a = \frac{1}{4}$

$S = \frac{1}{2}\left(\frac{1}{4}\right)(3^2)$

$= \frac{1}{8} \times 9 = \frac{9}{8} = 1\frac{1}{8}$ or 1.125

$S = 1.125$

(2)

(c) Factorise $x^2 - 5x$

$x(x - 5)$

(2)

(d) Expand and simplify $(x + 3)(x + 4)$

$x^2 + 4x + 3x + 12$

$x^2 + 7x + 12$

(2)

(e) Factorise $y^2 + 8y + 15$

$(y + 5)(y + 3)$

(2)

(Total 9 marks)

8 (a) Simplify $(c^2\ k^5)^4$

$(c^2)^4 \cdot (k^5)^4$

$= c^{(2\times4)}\ k^{(5\times4)} = c^8\ k^{20}$

$c^8\ k^{20}$ .....

(1)

(b) Expand and simplify $(3x + 5)(4x - 1)$

$12x^2 - 3x + 20x - 5$

$12x^2 + 17x - 5$ .....

(2)

(c) Solve $x^2 - 3x - 10 = 0$

$\Rightarrow (x + 2)(x - 5) = 0$

$\Rightarrow x + 2 = 0$

or $x - 5 = 0$

$\Rightarrow x = -2$ or 5

$x =$ -2 or 5 .....

(Total 6 marks)

9 The plan below shows a large rectangle of length $(2x + 6)$ m and width x m.

A smaller rectangle of length x m and width 3 m is cut out and removed.

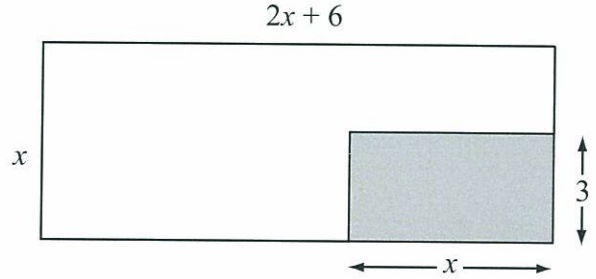


Diagram **NOT** accurately drawn

The area of the shape that is left is 100 m^2.

(a) Show that $2x^2 + 3x - 100 = 0$

$x(2x+6) - 3x = 100$

$\Rightarrow 2x^2 + 6x - 3x - 100 = 0$

$\Rightarrow 2x^2 + 3x - 100 = 0$

(3)

(b) Calculate the length of the smaller rectangle.
Give your answer correct to 3 significant figures.

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-3 \pm \sqrt{3^2 - 4(2)(-100)}}{2(2)}$

$= \frac{-3 \pm \sqrt{809}}{4} = 6.36 \text{ or } -7.86$

6.36 ..... m

(4)

(Total 7 marks)