Name	Class

☗ MATHS TEACHER HUB

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Solving equations
(9 – 1) Topic booklet
Higher

These questions have been collated from previous years GCSE Mathematics papers.

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

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*.
•Diagrams are NOT accurately drawn, unless otherwise indicated.
•You must **show all your working out.**
•If the question is a **1H** question you are not allowed to use a calculator.
•If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

Information
•The marks for **each** question are shown in brackets
 – *use this as a guide as to how much time to spend on each question*.

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.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

1   Solve $5x - 6 = 3(x - 1)$

$x = $ ....

(Total for Question 1 is 3 marks)

4   Solve $5x - 14 = 52 - x$

$x = $ ....

(Total for Question 4 is 3 marks)

7 Solve $\dfrac{5-x}{2} = 2x - 7$

$x =$ ....

(Total for Question 7 is 3 marks)

8 Solve $x^2 = 5x + 24$

(Total for Question 8 is 3 marks)

8 Steve is asked to solve the equation $5(x + 2) = 47$

Here is his working.
$$5(x + 2) = 47$$
$$5x + 2 = 47$$
$$5x = 45$$
$$x = 9$$

Steve's answer is wrong.

(a) What mistake did he make?

....

....

(1)

Liz is asked to solve the equation $3x^2 + 8 = 83$

Here is her working.
$$3x^2 + 8 = 83$$
$$3x^2 = 75$$
$$x^2 = 25$$
$$x = 5$$

(b) Explain what is wrong with Liz's answer.

....

....

(1)

(Total for Question 8 is 2 marks)

9 Solve $5x^2 - 4x - 3 = 0$

Give your solutions correct to 3 significant figures.

(3)

(Total for Question 9 is 3 marks)

10 Solve $\dfrac{9 + x}{7} = 11 - x$

$x = $ ....

(3)

(Total for Question 10 is 4 marks)

11 Solve $x^2 - 5x + 3 = 0$

Give your solutions correct to 3 significant figures.

....

(Total for Question 11 is 3 marks)

16 Solve $(4x - 3)(x + 5) < 0$

....

(Total for Question 16 is 2 marks)

16 Solve $(x-2)^2 = 3$

Give your solutions correct to 3 significant figures.

....

(Total for Question 16 is 2 marks)

17 Solve $x^2 - 6x - 8 = 0$

Write your answer in the form $a \pm \sqrt{b}$ where a and b are integers.

....

(Total for Question 17 is 3 marks)

17 Solve $7x^2 + 8x - 5 = 0$

Give your solutions correct to 3 significant figures.

(3)

Alex has to find the solutions of the quadratic equation $3k^2 + 10k - 8 = 0$
Here is his working and answer.

$$(3k - 2)(k + 4) = 0$$

$$k = 2 \text{ or } k = -4$$

(c) What mistake has Alex made?

(1)

(Total for Question 17 is 4 marks)

19 Solve $6x^2 + 5x - 6 = 0$

....

(Total for Question 19 is 3 marks)

19 Solve $2x^2 + 3x - 2 > 0$

....

(Total for Question 19 is 3 marks)

23 Here is a rectangle and a right-angled triangle.

$3x - 2$

$x - 1$

$2x$

x
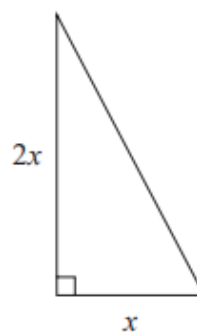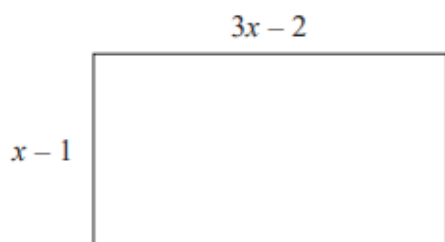
All measurements are in centimetres.
The area of the rectangle is greater than the area of the triangle.

Find the set of possible values of x.

(Total for Question 23 is 5 marks)

23 Given that $\dfrac{2x^2 + y^2}{4x^2 - y^2} = \dfrac{43}{11}$ where $x > 0$ and $y > 0$

find, in its simplest form, the ratio $x : y$

(Total for Question 23 is 4 marks)