SOLVING EQUATION

Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Higher Tier

1.

13 The number of animals in a population at the start of year t is P_t
The number of animals at the start of year 1 is 400

Given that

$$P_{t+1} = 1.01P_t$$

work out the number of animals at the start of year 3

.....

(Total for Question 13 is 2 marks)

Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Higher Tier

2.

14 y is inversely proportional to x^3

$y = 44$ when $x = a$

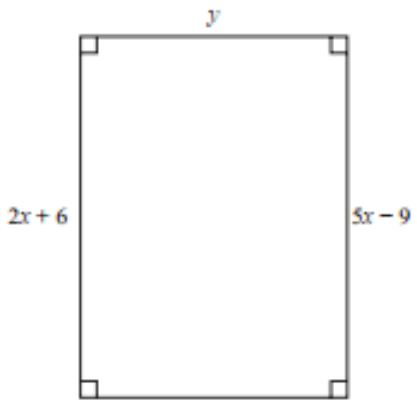
Show that $y = 5.5$ when $x = 2a$

(Total for Question 14 is 3 marks)

Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Higher Tier

3.

6 Here is a rectangle.



All measurements are in centimetres.

The area of the rectangle is 48 cm².

Show that $y = 3$

(Total for Question 6 is 4 marks)

Pearson Edexcel - Monday 6 November 2017 - Paper 2 (Calculator) Higher Tier

4.

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

$x =$.....

(Total for Question 1 is 3 marks)

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

5.

15 (a) Show that the equation $x^3 + 7x - 5 = 0$ has a solution between $x = 0$ and $x = 1$

(2)

(b) Show that the equation $x^3 + 7x - 5 = 0$ can be arranged to give $x = \dfrac{5}{x^2 + 7}$

(2)

(c) Starting with $x_0 = 1$, use the iteration formula $x_{n+1} = \dfrac{5}{x_n^2 + 7}$ three times to find an estimate for the solution of $x^3 + 7x - 5 = 0$

.....

(3)

(d) By substituting your answer to part (c) into $x^3 + 7x - 5$,
comment on the accuracy of your estimate for the solution to $x^3 + 7x - 5 = 0$

.....

.....

(2)

(Total for Question 15 is 9 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 1 (Non-Calculator) Higher Tier

6.

10 y is inversely proportional to x
When $x = 1.5$, $y = 36$

Find the value of y when $x = 6$

.....

(Total for Question 10 is 3 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

7.

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)

Pearson Edexcel - Specimen Papers Set 1 - Paper 1 (Non-Calculator) Higher Tier

8.

14 Solve $\frac{x+2}{3x} + \frac{x-2}{2x} = 3$

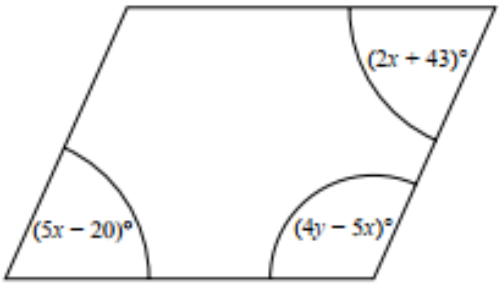
$x =$ .....

(Total for Question 14 is 3 marks)

Pearson Edexcel - Sample Paper 1 - (Non-Calculator) Higher Tier

9.

8 Here is a parallelogram.



Work out the value of x and the value of y.

x = ...

y = ...

(Total for Question 8 is 5 marks)

Pearson Edexcel - Sample Paper 3 - (Calculator) Higher Tier

10.

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

Give your solutions correct to 3 significant figures.

.....

(Total for Question 11 is 3 marks)

Pearson Edexcel - Sample Paper 3 - (Calculator) Higher Tier

11.

14 (a) Show that the equation $x^3 + 4x = 1$ has a solution between $x = 0$ and $x = 1$

(2)

(b) Show that the equation $x^3 + 4x = 1$ can be arranged to give $x = \frac{1}{4} - \frac{x^3}{4}$

(1)

(c) Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \frac{1}{4} - \frac{x_n^3}{4}$ twice, to find an estimate for the solution of $x^3 + 4x = 1$

.....

(3)

(Total for Question 14 is 6 marks)

Pearson Edexcel - Thursday 26 May 2016 - Paper 1 (Non-Calculator) Higher Tier

12.

22 Solve $x^2 = 4(x - 3)^2$

.....

(Total for Question 22 is 3 marks)

Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier

13.

20 Solve $3x^2 + 6x - 2 = 0$
Give your solutions correct to 2 decimal places.

.....

(Total for Question 20 is 3 marks)

Pearson Edexcel - Thursday 4 June 2015 - Paper 1 (Non-Calculator) Higher Tier

14.

19 There are n sweets in a bag.
6 of the sweets are orange.
The rest of the sweets are yellow.

Hannah takes at random a sweet from the bag.
She eats the sweet.

Hannah then takes at random another sweet from the bag.
She eats the sweet.

The probability that Hannah eats two orange sweets is $\frac{1}{3}$

(a) Show that $n^2 - n - 90 = 0$

(3)

(b) Solve $n^2 - n - 90 = 0$ to find the value of n.

.....

(3)

(Total for Question 19 is 6 marks)

Pearson Edexcel - Monday 8 June 2015 - Paper 2 (Calculator) Higher Tier

15.

25 Solve the equation $3x^2 + 4x - 12 = 0$
Give your solutions correct to 2 decimal places.

.....

(Total for Question 25 is 3 marks)

Pearson Edexcel - Friday 7 November 2014 - Paper 2 (Calculator) Higher Tier

16.

20 Solve $3x^2 - 5x - 1 = 0$
Give your solutions correct to 3 significant figures.

.....

(Total for Question 20 is 3 marks)

Pearson Edexcel - Friday 14 June 2013 - Paper 2 (Calculator) Higher Tier

17.

12 (a) Solve $3(x - 2) = x + 7$

$x =$ .....

(3)

(b) Solve $\frac{2 - y}{5} = 1$

$y =$ .....

(2)

(Total for Question 12 is 5 marks)

Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

18.

7 (a) Simplify $5x + 4y + x - 7y$

.....

(2)

(b) Solve $7(x + 2) = 7$

.....

(2)

(Total for Question 7 is 4 marks)

Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

19.

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

$x =$ .....

(Total for Question 17 is 3 marks)

Pearson Edexcel - Thursday 8 November 2012 - Paper 2 (Calculator) Higher Tier

20.

20 Simplify $\frac{x+1}{2} + \frac{x+3}{3}$

.....

(Total for Question 20 is 3 marks)

Pearson Edexcel - Thursday 8 November 2012 - Paper 2 (Calculator) Higher Tier

21.

22 (a) Solve $2x^2 + 9x - 7 = 0$

Give your solutions correct to 3 significant figures.

.....

(3)

(b) Solve $\frac{2}{y^2} + \frac{9}{y} - 7 = 0$

Give your solutions correct to 3 significant figures.

.....

(2)

(Total for Question 22 is 5 marks)

Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier

22.

22 Solve $3x^2 - 4x - 2 = 0$
Give your solutions correct to 3 significant figures.

.....

(Total for Question 22 is 3 marks)

Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

23.

19. Solve the equation $5x^2 + 8x - 6 = 0$
Give each solution correct to 2 decimal places.

.....

(Total 3 marks)

Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

24.

24. Solve $\frac{5(2x+1)^2}{4x+5} = 5x - 1$

.....

(Total 5 marks)

Pearson Edexcel - Wednesday 9 November 2011 - Paper 3 (Non-Calculator) Higher Tier

25.

20. (a) Factorise $2x^2 - 9x + 4$

.....

(2)

Hence, or otherwise,

(b) solve $2x^2 - 9x + 4 = (2x - 1)^2$

.....

(4)

(Total 6 marks)

Pearson Edexcel - Monday 14 November 2011 - Paper 4 (Calculator) Higher Tier

26.

19. Find the exact solutions of $x + \frac{3}{x} = 7$

.....

(Total 3 marks)

Pearson Edexcel - Monday 6 June 2011 - Paper 3 (Non-Calculator) Higher Tier

27.

27. Solve the equation $\frac{x}{2} - \frac{2}{x+1} = 1$

.....

(Total 4 marks)

Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier

28.

10. (a) Simplify $6e + 5f + e - 3f$

.....

(2)

(b) Solve $4(2x - 1) = 3x - 19$

$x =$ .....

(3)

(c) Solve $\frac{y+4}{5} = 30$

$y =$ .....

(2)

(Total 7 marks)

Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier

29.

18. (a) Simplify $(c^2 k^5)^4$

.....

(1)

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

.....

(2)

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

$x =$ .....

(3)

(Total 6 marks)

Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier

30.

23. The diagram below shows a large rectangle of length $(2x + 6)$ cm and width x cm.

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

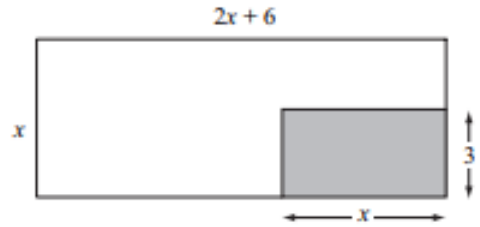


Diagram **NOT** accurately drawn

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

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

(3)

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

..... cm

(4)

(Total 7 marks)

Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier

31.

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

.....

(2)

(b) Solve $x^2 + 8x - 9 = 0$

.....

(3)

(Total 5 marks)

Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier

32.

6. (a) Simplify $7x + 2y - x + 3y$

.....

(2)

(b) Solve $2x + 3 = 10$

$x =$ .....

(2)

(c) Simplify

(i) $c^5 \times c^6$

.....

(ii) $e^{12} \div e^4$

.....

(2)

(Total 6 marks)

Pearson Edexcel - Friday 11 June 2010 - Paper 4 (Calculator) Higher Tier

33.

11.

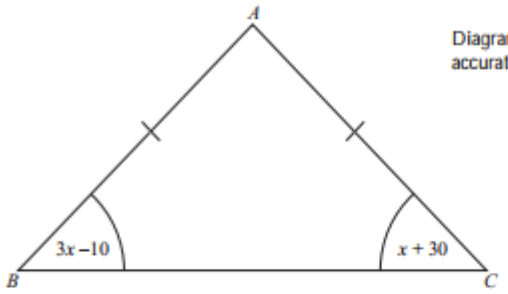


Diagram **NOT** accurately drawn

ABC is an isosceles triangle.
AB = *AC*.

(a) Explain why $3x - 10 = x + 30$

.....

(1)

(b) Solve $3x - 10 = x + 30$

$x =$ .....

(2)

(Total 3 marks)

Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier

34.

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

.....

(2)

(b) Solve $\frac{29-x}{4} = x + 5$

$x =$ .....

(3)

(Total 5 marks)

Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier

35.

29. Solve $\frac{4}{x+3}+\frac{3}{2x-1}=1$

.....

(Total 5 marks)

OCR GSCE – Tuesday 3 November 2020 – Paper 4 (Calculator) Higher Tier

36.

15 Here are two pieces of work.

For each one, describe the error made and give the complete correct solution.

(a)

Question:

Solve by factorisation.

$3x^2 - 2x - 5 = 0$

Solution:

$(3x + 5)(x - 1) = 0$

Therefore $x = -5/3$ or $x = 1$

Error: .....

.....

Correct solution:

(b)

Question:

Solve, giving your answers correct to 3 significant figures.

$$2x^2 - 8x + 3 = 0$$

Solution:

$$x = -(^-8) \pm \frac{\sqrt{(^-8)^2 - 4 \times 2 \times 3}}{2 \times 2}$$

Therefore $x = 6.42$ or $x = 9.58$

Error: .....

.....

Correct solution:

[3]

OCR GSCE – Thursday 5 November 2020 – Paper 5 (Non-Calculator) Higher Tier

37.

2 **(a)** Solve.

$4x + 3 = 13$

(a) $x =$ ..... **[2]**

(b) Multiply out and simplify.

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

(b) ..... **[3]**

OCR GSCE – Thursday 5 November 2020 – Paper 5 (Non-Calculator) Higher Tier

38.

15 Solve.

$$\frac{x}{x+6} = 5$$

$x =$ ..... **[3]**

OCR GSCE – Thursday 7 November 2019 – Paper 5 (Non-Calculator) Higher Tier

39.

5 Solve.

$$6x - 10 = 4x + 1$$

$x =$ ..... **[3]**

OCR GSCE – Tuesday 21 May 2019 – Paper 4 (Calculator) Higher Tier

40.

19 Solve this equation algebraically.
Give your solutions correct to 2 decimal places.

$$3x^2 + 8x - 5 = 0$$

$x =$ ..... or $x =$ ..... **[4]**

OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

41.

20 (a) Show that the equation $x^4 - x^2 - 9 = 0$ has a solution between $x = 1$ and $x = 2$. **[3]**

(b) Find this solution correct to 1 decimal place.
Show your working.

(b) $x =$ ..... **[4]**

OCR GSCE – Tuesday 6 November 2018 – Paper 4 (Calculator) Higher Tier

42.

16 Solve by factorisation.

$$2x^2 - 19x - 33 = 0$$

$x =$ ..... or $x =$ ..... **[3]**

OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

43.

20 (a) Prove that $(2x+1)(3x+2)+x(3x+5)+2$ is a perfect square.

.....

.....

.....

.....

..... **[6]**

(b) Gemma says

The equation $(2x+1)(3x+2)+x(3x+5)+2=-12$ has no solutions.

Explain Gemma's reasoning.

.....

..... **[1]**

OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier

44.

20 Solve this equation, giving your answers correct to 1 decimal place.

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

x = ... or x = ... **[6]**

OCR GSCE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier

45.

18 Solve this equation algebraically.
Give your solutions correct to 2 decimal places.

$$3x^2 + 5x - 1 = 0$$

$x =$ ..... or $x =$ ..... **[4]**

OCR GSCE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

46.

18 (a) Solve by factorisation.

$$2x^2 + 5x - 12 = 0$$

(a) $x =$ ..... or $x =$ ..... **[3]**

(b) Solve this equation.
Give each value correct to 2 decimal places.

$$3x^2 + 2x - 3 = 0$$

(b) $x =$ ..... or $x =$ ..... **[3]**

OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

47.

2 **(a)** **(i)** Solve.

$5x + 1 > x + 13$

(a)(i) ..... **[3]**

(ii) Write down the largest integer that satisfies $5x - 1 < 10$.

(ii) ..... **[1]**

(b) Solve.

$3x^2 = 75$

(b) $x =$ ..... **[2]**

(c) Solve.

$4x + 3y = 5$
$2x + 3y = 1$

(c) $x =$ .....

$y =$ .....

[3]

AQA GSCE – Thursday 4 June 2020 – Paper 2 (Calculator) Higher Tier

48.

29 Solve $\frac{5}{4x+1} = \frac{2x}{x^2+3}$

Give your solutions to 3 significant figures.

You **must** show your working.

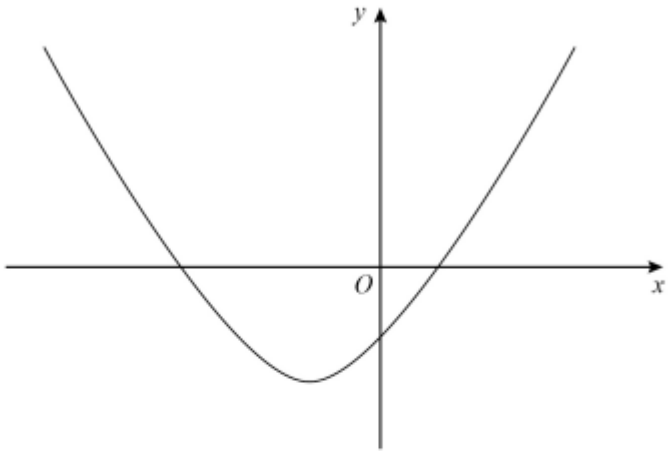
[5 marks]

Answer _____

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

49.

24 Here is a sketch of the curve $y = x^2 + 4x - 12$



Work out the values of x for which $x^2 + 4x - 12 < 0$

Give your answer as an inequality.

[3 marks]

Answer _____

AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

50.

4 Circle the **two** roots of $(x - 5)(x + 3) = 0$

[1 mark]

–5 –3 3 5

AQA GSCE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

51.

18 (a) Write $x(3x - 9) = 4$ in the form $ax^2 + bx + c = 0$ where a, b and c are integers.

[1 mark]

Answer _____

18 (b) Solve $x(3x - 9) = 4$

Give your answers to 2 decimal places.

[2 marks]

Answer _____

AQA GSCE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier

52.

12 Solve $x^2 - x - 12 = 0$

[3 marks]

Answer _____

AQA GSCE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier

53.

22 Solve $\frac{x}{x+4} + \frac{7}{x-2} = 1$

You **must** show your working.

[4 marks]

$x =$ _____

AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

54.

7 Work out the values of a and b in the identity

$$5(7x + 8) + 3(2x + b) \equiv ax + 13$$

[4 marks]

$a =$ _____ $b =$ _____

AQA GSCE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

55.

27 The line $y = 3x + p$ and the circle $x^2 + y^2 = 53$ intersect at points A and B.
p is a positive integer.

27 (a) Show that the x-coordinates of points A and B satisfy the equation

$$10x^2 + 6px + p^2 - 53 = 0$$

[3 marks]

27 (b) The coordinates of A are (2, 7)

Work out the coordinates of B.

You **must** show your working.

[5 marks]

Answer (_____ , _____)

AQA GSCE – Thursday 7 June 2018 – Paper 2 (Calculator) Higher Tier

56.

18 The solution of $3^x = 300$ lies between two consecutive integers.

Work out the two integers.

[1 mark]

Answer _____ and _____

AQA GSCE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

57.

18 Circle the **two** roots of $(2x + 3)(5x - 2) = 0$

[1 mark]

$-\frac{3}{2}$ $-\frac{2}{5}$ $\frac{2}{5}$ $\frac{3}{2}$

AQA GSCE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

58.

5 Solve $4(3x - 2) = 2x - 5$

[3 marks]

$x =$ _____

AQA GSCE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

59.

27 Solve $\frac{x}{4} - \frac{2x}{x+2} = 1$

Give your solutions to 2 decimal places.

You **must** show your working.

[6 marks]

Answer _____

AQA GSCE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier

60.

21 Solve $5x^2 = 10x + 4$

Give your answers to 2 decimal places.

[4 marks]

Answer _____

AQA GSCE – Tuesday 13 June 2017 – Paper 3 (Calculator) Higher Tier

61.

12 $\left(ar^b\right)^4 = 16r^{20}$ where a and b are positive integers.

Work out a and b

[2 marks]

$a =$ _____ $b =$ _____

AQA GSCE – Sample Paper 1 (Non - Calculator) Higher Tier

62.

6 Kelly is trying to work out the two values of w for which $3w - w^3 = 2$

Her values are 1 and –1

Are her values correct?

You **must** show your working.

[2 marks]

AQA GSCE – Sample Paper 2 (Calculator) Higher Tier

63.

11 Circle the equation with roots 4 and –8

[1 mark]

$4x(x-8)=0$ $(x-4)(x+8)=0$

$x^2-32=0$ $(x+4)(x-8)=0$

AQA GSCE – Sample Paper 2 (Calculator) Higher Tier

64.

25 $2x^2-6x+5$ can be written in the form $a(x-b)^2+c$ where a, b and c are positive numbers.

25 (a) Work out the values of a, b and c.

[3 marks]

$a =$ _____

$b =$ _____

$c =$ _____

25 (b) Using your answer to part (a), or otherwise, solve $2x^2 - 6x + 5 = 8.5$

[3 marks]

Answer