



# GCSE Foundation/Higher 11

*Algebra*

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Questions



93 minutes



82 marks

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*Equations*

**Q1.** (a) Solve  $\frac{12-x}{3} = 5$

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Answer  $x =$  .....

(3)

(b) Rearrange this formula to make  $t$  the subject.

$$s = 3t + 4$$

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Answer  $t =$  .....

(2)

(Total 5 marks)

**Q2.** (a) Solve  $5x + 3 = 3(x + 2)$

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Answer  $x =$  .....

(3)

(b)  $2(x + 16) + 4(x - 5)$  simplifies to  $a(x + b)$

Work out the values of  $a$  and  $b$ .

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Answer  $a = \dots\dots\dots$  ,  $b = \dots\dots\dots$

(3)  
(Total 6 marks)

- Q3.** Three whole numbers add up to 50.  
The two smallest numbers are the same.  
Two of the numbers have a difference of 8.

Find the three numbers.

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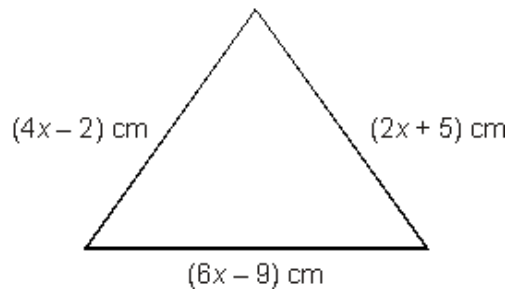
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Answer ..... , ..... , .....

(Total 4 marks)

**Q4.** The triangle has lengths  $(4x - 2)$  cm,  $(2x + 5)$  cm and  $(6x - 9)$  cm.



Find the value of  $x$  that makes this triangle equilateral.

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Answer .....

**(Total 4 marks)**

**Q5.** (a) Solve the equation  $\frac{x}{6} = 7$

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Answer  $x =$  .....

**(1)**

(b) Solve the equation  $\frac{x+1}{2-3x} = 3$

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Answer  $x =$  .....

(3)  
(Total 4 marks)

**Q6.** (a) Solve  $8t - 5 = 19$

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Answer  $t =$  .....

(2)

(b) Nails cost 3 pence each.

Screws cost 5 pence each.

Write down an expression for the cost of  $x$  nails and  $y$  screws.

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Answer ..... pence

(2)

(c) Expand and simplify  $4(2w + 3) - 5(3w + 7)$

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Answer .....

(2)  
(Total 6 marks)

**Q7.** (a) Solve the equation  $\frac{x}{20} = -4$

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Answer  $x =$  .....

(1)

(b) Solve the equation  $8w - 5 = 3w + 1$

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Answer  $w =$  .....

(3)

(c) Simplify  $y + 2 \times y \times y$

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Answer .....

(1)

(d) Factorise  $15t + 25$

.....

Answer .....

(1)

(e) Factorise  $z^2 + 8z$

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Answer .....

(1)

(Total 7 marks)

**Q8.**  $x$  is a number such that  $x(x - 1)(x + 2) = 40$

Use trial and improvement to find a solution for  $x$ .  
Give your answer to 1 decimal place.

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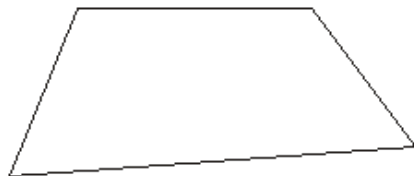
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Answer  $x =$  .....

**(Total 4 marks)**

**Q9.** (a) Explain why the sum of the angles in any quadrilateral is  $360^\circ$ .



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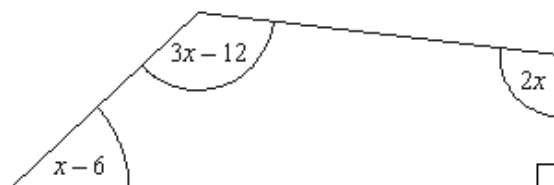
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**(2)**

(b) A quadrilateral has one right angle.  
The other angles are  $2x$ ,  $3x - 12$  and  $x - 6$

Not drawn accurately



(i) Write down an equation in terms of  $x$ .

Answer .....

**(1)**

- (ii) Solve your equation and find the size of the largest angle in the quadrilateral.

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Answer  $x =$  ..... degrees

Largest angle = ..... degrees

(3)  
(Total 6 marks)

- Q10.** (a) Expand and simplify  $2(3x - 2) + 4(x + 5)$

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Answer .....

(2)

- (b) Solve the equation  $2(3x - 2) + 4(x + 5) = 4(x - 2)$

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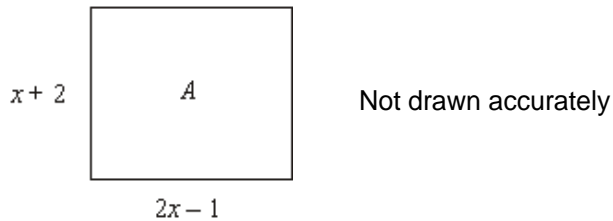
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Answer  $x =$  .....

(3)  
(Total 5 marks)



- Q11.** Rectangle  $A$  has length  $(2x - 1)$  cm and width  $(x + 2)$  cm.

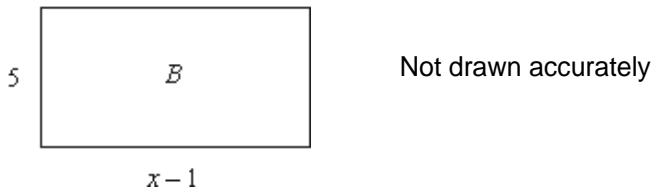


- (a) Show that the perimeter of rectangle  $A$  is  $(6x + 2)$  cm.

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(1)

- (b) Rectangle  $B$  has length  $(x - 1)$  cm and width 5 cm.



The perimeter of rectangle  $A$  is equal to the perimeter of rectangle  $B$ .  
 Write down and solve an equation in  $x$ .

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Answer  $x =$  .....

(4)

- (c) Find the **area** of rectangle  $A$ .

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Answer .....  $\text{cm}^2$

(2)

(Total 7 marks)

**Q12.** (a) Simplify  $2x + 8 + 4x - 3$

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Answer .....

(2)

(b) Solve the equation.

$$\frac{x}{3} = 5$$

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Answer  $x =$  .....

(1)

(c) Tom is investigating the two expressions  $ab + c$  and  $a(b + c)$

(i) He finds that both expressions have the same value when  $a = 1$ ,  $b = 3$  and  $c = 4$ . Show that this is true.

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(3)

(ii) Tom says that this means that  $a(b + c) = ab + c$ . Explain why Tom is wrong.

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(2)

(Total 8 marks)

**Q13.** Use trial and improvement to find a solution to the equation

$$x^3 - x = 21$$

Give your answer to one decimal place.  
You **must** show your working.

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Answer  $x =$  .....

(Total 4 marks)

- Q14.** In the table below, the letters  $w$ ,  $x$ ,  $y$  and  $z$  represent different numbers. The total of each row is given at the side of the table.

$w$	$w$	$w$	$w$	24
$w$	$w$	$x$	$x$	28
$w$	$w$	$x$	$y$	25
$w$	$x$	$y$	$z$	23

Find the values of  $w$ ,  $x$ ,  $y$  and  $z$ .

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Answer  $w =$  ..... ,  $x =$  ..... ,  $y =$  ..... ,  $z =$  .....

(Total 4 marks)

**Q15.** Parveen is using trial and improvement to find a solution to the equation

$$x^3 + 7x = 30$$

This table shows her first two trials.

<b>x</b>	<b><math>x^3 + 7x</math></b>	<b>Comment</b>
2	22	Too small
3	48	Too big

Continue the table to find a solution to the equation.

Give your answer to 1 decimal place.

Answer .....

**(Total 3 marks)**

**Q16.** (a) Solve the equation  $\frac{23 - 2x}{5} = 3$

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Answer x = .....

**(3)**

(b) Solve the inequality  $3x + 8 < 29$

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Answer .....

(2)  
(Total 5 marks)

**Q17.** Kate and Lee are working out this question.

A solution of the equation  $x^3 + x = 700$  lies between 8 and 9.  
Use trial and improvement to find this solution, correct to one decimal place.

Kate's answer is 8.8

Lee's answer is 8.9

Which answer is correct?  
You **must** show all your working.

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Answer  $x =$  .....

(Total 3 marks)

