



GCSE Foundation 13

Algebra



98 minutes



93 marks

Formulae

Q1. (a) Solve $\frac{y}{3} = 8$

.....

Answer $y =$

(1)

(b) Simplify fully $3c + 5d + 4c - 2d$

.....

Answer

(2)

(c) Given that $P = 3e + 5f$

work out the value of P when $e = 4$ and $f = -2$

.....

.....

.....

Answer

(2)

(Total 5 marks)

Q2. Work out the value of $5x - 4y$ when $x = 3$ and $y = \frac{1}{2}$

.....

.....

Answer

(Total 2 marks)

Q3. n is a whole number.

Joe says that $n^2 - 1$ is never a multiple of 7.

Give an example to show that he is wrong.

.....

.....

.....

(Total 2 marks)

Q4. Ann's pay (£) is worked out using this formula.

$$\text{Pay} = \text{Number of hours worked} \times 12 + 30$$

Ann works for 20 hours.

Work out her pay.

.....

.....

.....

Answer £

(Total 3 marks)

Q5. (a) Work out the value of $2a + 3b$ when $a = 5$ and $b = 8$

.....

.....

Answer

(2)

(b) Expand and simplify $3(2m - 4) + 5(m + 2)$

.....

.....

.....

Answer

(2)

(Total 4 marks)

Q6. You are given that $P = x^2 - y^2$

(a) Show that P is a prime number when $x = 4$ and $y = 3$

.....

.....

(2)

(b) Work out **two** other pairs of values for x and y so that P is a prime number.

.....

.....

.....

.....

Answer $x =$ and $y =$

$x =$ and $y =$

(3)
(Total 5 marks)

Q7. Here are instructions for cooking a turkey.

Cook for 15 minutes at 220 °C
Reduce the oven temperature to 160 °C
and cook for 40 minutes per kilogram.

Kirsty is going to cook a 7 kilogram turkey.

She wants to take it out of the oven at 12.45 pm.

At what time must she start to cook it?

.....

.....

.....

.....

Answer

(Total 4 marks)

Q8. (a) If $x \diamond y$ means $2x + y$ find the value of $2 \diamond 8$

.....

Answer

(1)

- (b) If $m \blacktriangledown n$ means $\frac{m+n}{2}$ find the value of $4 \blacktriangledown 10$

.....

Answer

(2)

- (c) Simplify $6a + 7b - 2a + b$

.....

.....

Answer

(2)

- (d) Solve the equation $5w + 6 = 9 - w$

.....

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.....

.....

Answer $w =$

(3)

(Total 8 marks)

- Q9.** A shopkeeper uses this formula to calculate the total cost when customers pay by monthly instalments.

$$C = d + 24 \times m$$

C is the total cost in pounds.

d is the deposit in pounds.

m is the monthly instalment in pounds.

- (a) The deposit for a wardrobe is £16.
The monthly payments are £10.

What is the total cost?

.....

.....

.....

Answer £

(2)

- (b) How many years does it take to finish paying for goods using this formula?

.....

Answer years

(1)

- (c) The total cost of a sofa is £600.
The deposit is £120.

Work out the value of the monthly instalment.

.....

.....

.....

Answer £

(3)

(Total 6 marks)

- Q10.** (a) The basic monthly charge for a mobile phone contract is £35.

This includes:

Option 1: 300 free minutes of calls and 100 free texts

or

Option 2: 100 free minutes of calls and unlimited free texts.

All other calls are charged at 6p per minute.

Extra texts are charged at 10p each.

On average, each month, Matt makes 500 minutes of calls and sends 250 texts.

Which option should he choose?
You **must** show your working.

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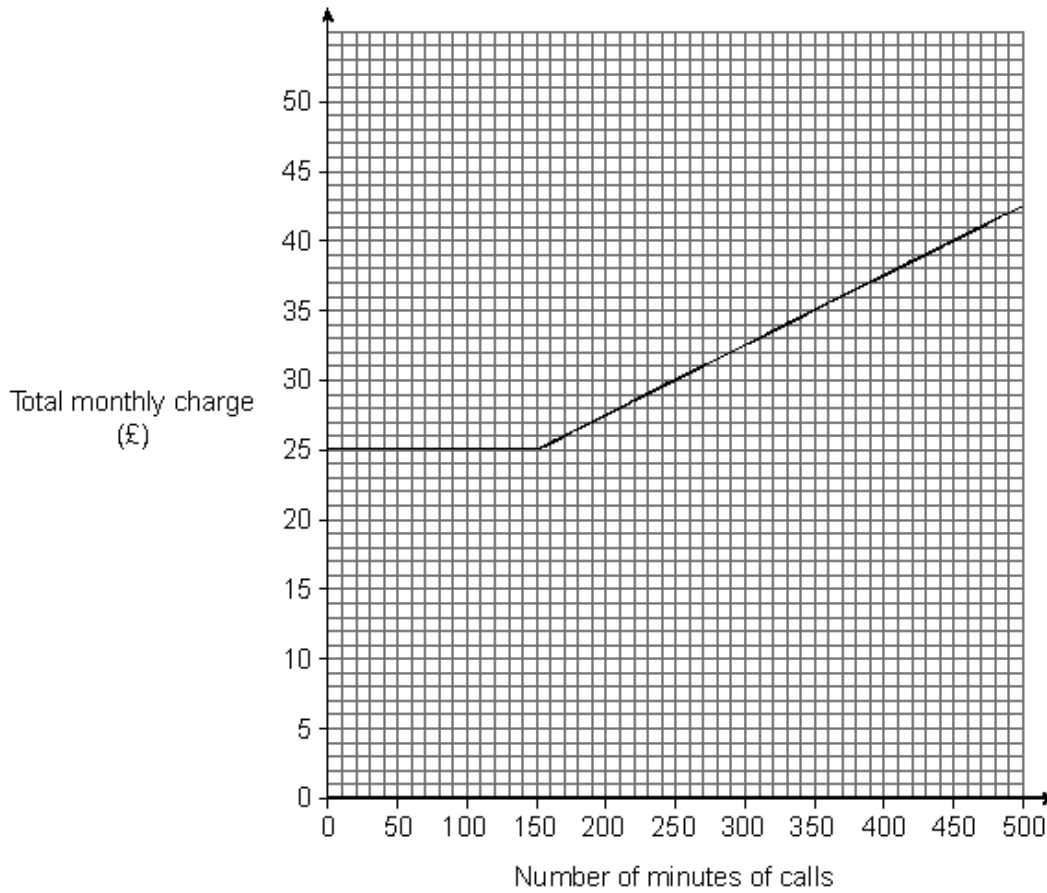
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Answer

(5)

- (b) Viki has a different mobile phone contract.
She never sends texts.
The graph shows how the total monthly charge is calculated for her mobile phone contract for up to 500 minutes of calls.



- (i) Write down the basic monthly charge and the number of free minutes of calls.

Answer Basic monthly charge £

Number of free minutes of calls

(2)

- (ii) Work out the charge per minute for the other calls.

.....

.....

.....

.....

Answer pence

(3)

(Total 10 marks)

Q11. Given that $a = 7$, $b = 3$ and $c = 5$

- (a) Work out the value of $a + 2b + 3c$

.....
.....

Answer

(2)

- (b) Work out the value of abc

.....
.....

Answer

(2)

- (c) $abcd = 0$

Write down the value of d .

Answer

(1)

(Total 5 marks)

Q12. A teacher sets an extended task.

Any task that is handed in late has the original mark reduced using this formula.

$\text{Reduction} = \frac{\text{Number of days late} \times \text{Original mark}}{40}$
--

- (a) Adam hands in his task ten days late.

His original mark is 32.

Work out the new mark.

.....
.....
.....

Answer

(3)

- (b) Belinda hands in her task 14 days late.

Her mark is reduced by 7 marks.

Work out the original mark.

.....

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.....

.....

.....

Answer

(3)
(Total 6 marks)

Q13. Complete this table.

Expression	Value
$2x$	8
$5x$	
$2x + 3y$	5
y	
$3x - y$	

.....

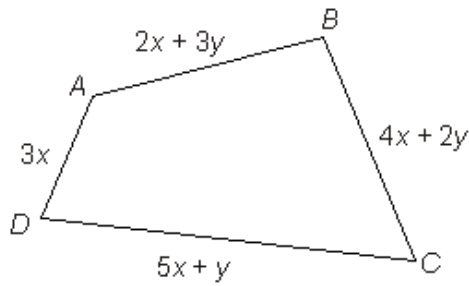
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(Total 5 marks)

Q14. $ABCD$ is a quadrilateral.



Not drawn accurately

- (a) Write down an expression for the perimeter of the quadrilateral in terms of x and y . Simplify your answer.

.....

Answer

(2)

- (b) When $x = 4$ cm, the perimeter of the quadrilateral is 68 cm.

Find the value of y .

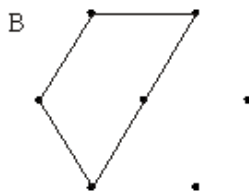
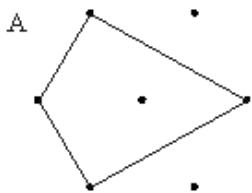
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Answercm

(3)

(Total 5 marks)

Q15. Frank draws two quadrilaterals on a seven-point triangular grid.



- (a) (i) What special name is given to quadrilateral A?

Answer

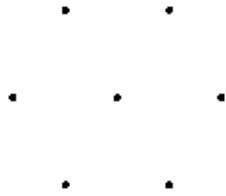
(1)

- (ii) What special name is given to quadrilateral B?

Answer

(1)

- (b) By joining 4 dots on the seven-point grid below draw a rectangle.



(1)

- (c) By joining 3 dots on the seven-point grid below draw an equilateral triangle.



(1)

- (d) The perimeter of quadrilateral A can be found using the formula

$$P = 2a + 2b$$

Find P when $a = 3$ and $b = 5.2$

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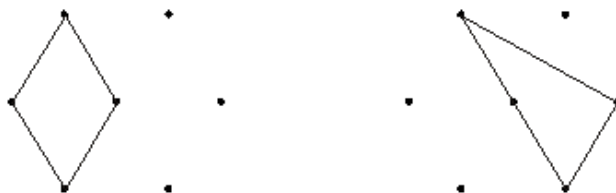
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Answer $P =$

(2)

- (e) Frank now draws a quadrilateral and a triangle.



Explain why the areas of the two shapes are the same.

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.....

.....

(2)

(Total 8 marks)

- Q16.** (a) Suki is playing a 'Think of a Number' game.



I think of a number.
I multiply it by 5 and
then subtract 3.
The answer is 27.

What number does Suki think of?

.....
.....
.....

Answer

(2)

- (b) Tim is also playing a 'Think of a Number' game.



I think of a number.
I call it x .
I add 2 to my number
and then multiply by 5.
The answer is ...

Write down an expression in terms of x for Tim's answer.

.....
.....
.....

Answer

(2)

(Total 4 marks)

- Q17.** This is the payment plan for Donal's mobile phone.
He receives a bill every month.

PAYMENT PLAN



£5 per month

PLUS

5p per minute

- (a) In January, Donal did not make any calls.
How much was his bill?

.....

Answer £

(1)

- (b) In February, Donal made 100 minutes of calls. How much was his bill?

.....

.....

Answer £

(2)

- (c) In March, Donal's bill was £7.50
How many minutes of calls did he make?

.....

.....

Answer minutes

(2)

(Total 5 marks)

- Q18.** (a) Simplify $5x + 3y - 2x + 4y$

.....

Answer

(2)

- (b) Find the value of $5p + 2q$ when $p = 4$ and $q = -7$

.....
.....

Answer

(2)

- (c) Find the value of $u^2 - v^2$ when $u = 5$ and $v = 3$

.....
.....

Answer

(2)

(Total 6 marks)

