

GCSE
MATHEMATICS (8300)
COMMON GRADES 4 & 5
Algebra

Total number of marks: 34 per optional item

Q20Solve $3x - 8 = 19$

$$\begin{aligned} 3x - 8 &= 19 \\ 3x &= 27 \\ x &= 9 \end{aligned}$$

$$x = \underline{9}$$

(Total 2 marks)**Q19** $a = 7$ and $b = 2$ Work out the value of $\frac{a}{b} - a^b$ **(Total 3 marks)**

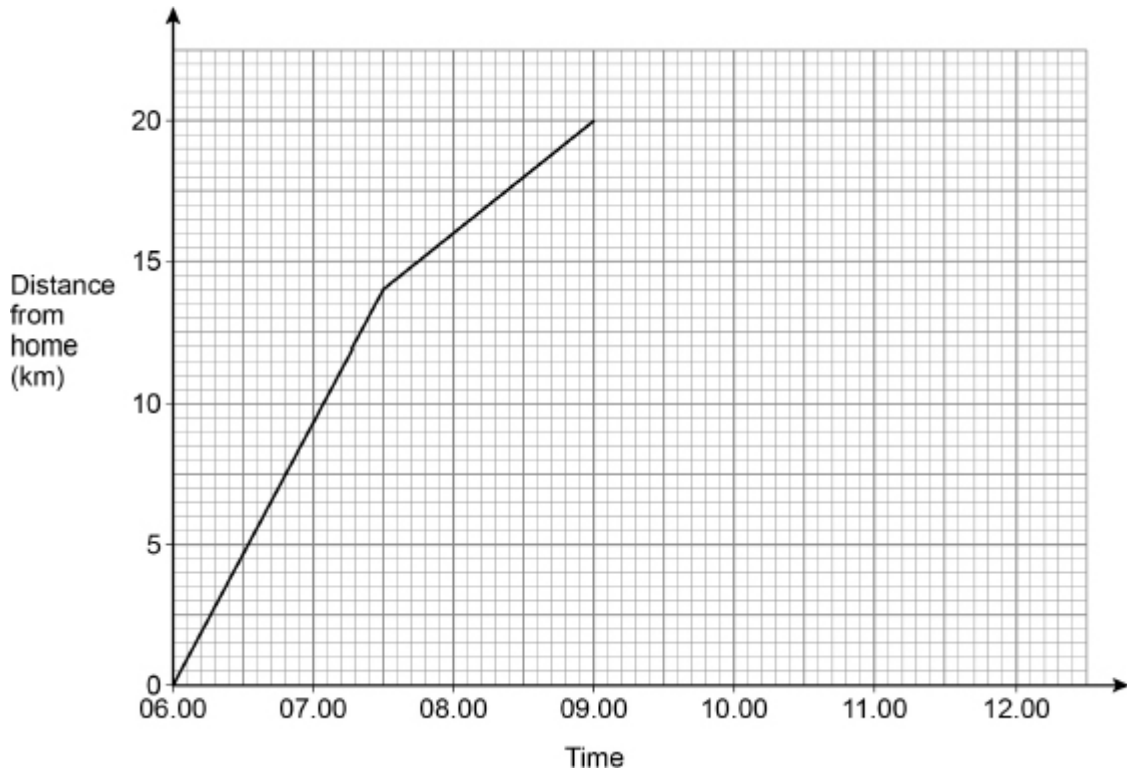
$$\frac{7}{2} - 7^2 \Rightarrow 3.5 - 49 = -45.5$$

Q18a

Jenny leaves home at 06.00

She runs for 3 hours.

Here is a distance-time graph of her run.



- (a) How far from home is she after 3 hours?

Answer 20 km

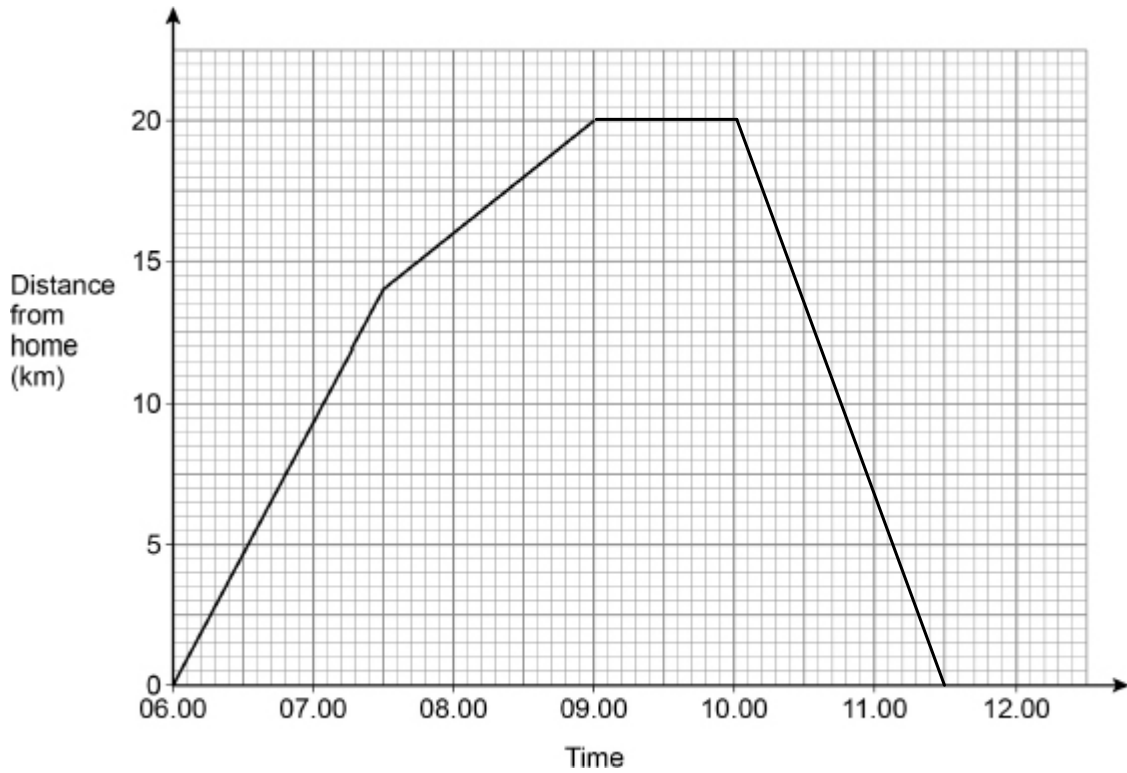
(Total 1 mark)

Q18b

Jenny leaves home at 06.00

She runs for 3 hours.

Here is a distance-time graph of her run.



(b) For the next hour she rests.

She then gets a bus home.

She arrives home at 11.30

Complete the distance-time graph.

Assume the bus travels at a constant speed.

(Total 2 marks)

Q19a

The value of x can be 2 or 5

The value of y can be 3 or 12

- (a) List the possible values of xy

$$\begin{array}{l} xy \Rightarrow 2 \times 3 = 6 \\ \Rightarrow 2 \times 12 = 24 \\ \Rightarrow 5 \times 3 = 15 \\ \Rightarrow 5 \times 12 = 60 \end{array}$$

(Total 2 marks)

Q19b

The value of x can be 2 or 5

The value of y can be 3 or 12

- (b) Work out the **least** possible value of $\frac{x-y}{x}$
You **must** show your working.

least possible value occurs when numerator is smallest and denominator is largest.

$$\Rightarrow \frac{2-3}{5} = \frac{-1}{5} = -0.2$$

(Total 2 marks)

Q15a

A line has the equation $y = x + 3$

$$\begin{array}{l} y = x + 3 \\ y = 0 + 3 \Rightarrow y = 3 \end{array}$$

- (a) Write down the coordinates of the point where the line intersects the y -axis.

Answer (0 , 3)

(Total 1 mark)

Q15b

A line has the equation $y = x + 3$

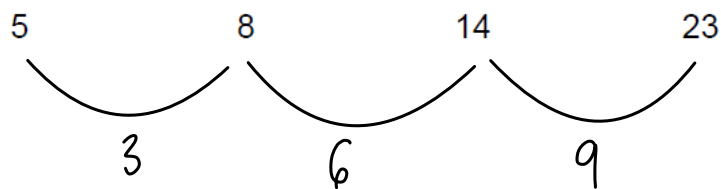
- (b) Write down the coordinates of the point where the line intersects the x -axis.

Answer (-3 , 0)

(Total 1 mark)

Q10

Work out the next term of this quadratic sequence.



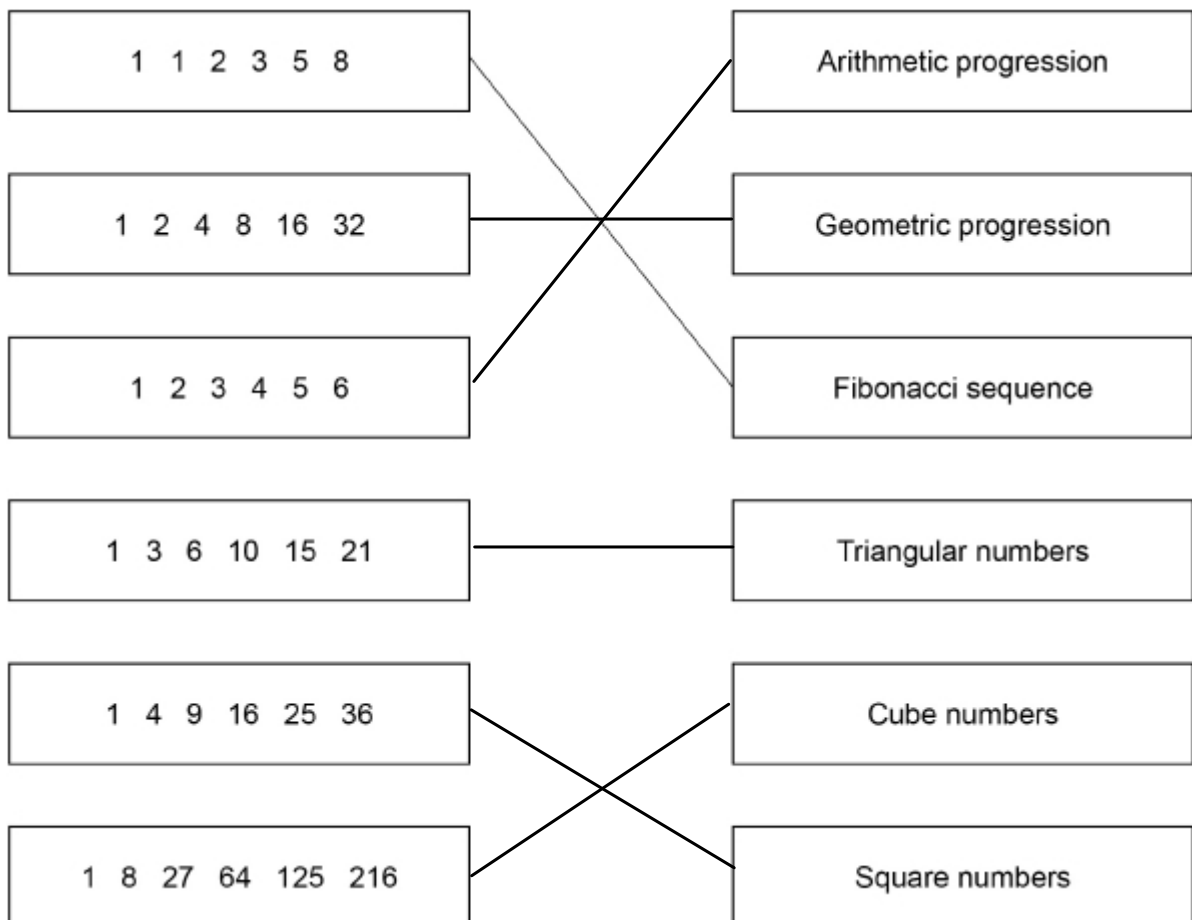
35

(Total 2 marks)

Q23

Match each sequence to its description.

One has been done for you.



(Total 4 marks)

Q17

In a bag there are 10p coins, 20p coins and 50p coins.

There are two **fewer** 20p coins than 10p coins.

There are five **more** 50p coins than 10p coins.

$$10p = n$$

$$20p = n - 2$$

$$50p = n + 5$$

(a)

Complete the table.

[1 mark]

Coin	Number of coins
10p	n
20p	$n - 2$
50p	$n + 5$

$$n + n - 2 + n + 5 = 60$$

$$3n + 3 = 60$$

$$3n = 57$$

$$n = 19$$

$$\begin{aligned} \text{number of 20p} &= 19 - 2 \\ \text{coins} &= 17 \end{aligned}$$

(b) Altogether, there are 60 coins.

Work out the total **value** of the 20p coins.

Answer £ 3.40

$$17 \times 20p = 340p$$

(4 marks)

Q27

Solve the simultaneous equations

$$7x + 2y = 36$$

$$- (3x + 2y = 16)$$

$$4x = 20$$

$$x = 5$$

$$x = \underline{5} \quad y = \underline{\frac{1}{2}}$$

(Total 3 marks)

$$3(5) + 2y = 16$$

$$2y = 1$$

$$y = \frac{1}{2}$$

Q16a

Factorise fully $9y^3 - 6y$

$$3y(3y^2 - 2)$$

(Total 2 marks)

Q12

A straight line
has gradient 4
and
passes through the point (5, 23)

$$m = 4$$

$$y = 23 \text{ when } x = 5$$

$$23 = 4(5) + c$$

$$\therefore c = 3$$

Work out the equation of the line.

Give your answer in the form $y = mx + c$

$$y = 4x + 3$$

(Total 3 marks)

Q17

$$w = \frac{3}{5\sqrt{x}} \quad w = \frac{3}{5\sqrt{x}} \Rightarrow w^2 = \frac{9}{25x}$$

Circle the expression for w^2

$$\frac{6}{10x^2}$$

$$\frac{9}{25x^2}$$

$$\frac{6}{10x}$$

$$\frac{9}{25x}$$

(Total 1 mark)