

**GCSE**  
**MATHEMATICS (8300)**  
**COMMON GRADES 4 & 5**  
Number

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Total number of marks: 33 per optional item

## Q15

Which of these fractions is closer in value to 1?

$$\left(\frac{3}{4}\right) = 0.75 \quad \frac{13}{10} = 1.3$$

You **must** show your working.

(Total 2 marks)

## Q14a

- (a) Use your calculator to work out  $9.95^2 \times 29.8$

Give your answer as a decimal.

Write down your full calculator display.

2950.2745

(Total 1 mark)

## Q14b

- (b) Is your answer to part (a) sensible?

Use approximations to decide.

You **must** show your working.

Tick a box.

Sensible

Not sensible

$$9.95 \approx 10$$

$$29.8 \approx 30$$

$$10^2 \times 30 = 100 \times 30 = 3000$$

$$3000 \approx 2950.2745 \text{ as}$$

$$2950 \text{ rounds up to } 3000$$

(Total 3 marks)

## Q15

Show that there are **exactly** five 3-digit cube numbers.

$$\begin{array}{ll}
 4^3 = 64 \text{ (2 digits)} & 8^3 = \underline{512} \\
 5^3 = \underline{125} & 9^3 = \underline{729} \\
 6^3 = \underline{216} & 10^3 = 1000 \text{ (4 digits)} \\
 7^3 = \underline{343} &
 \end{array}$$

(Total 3 marks)

## Q18

$x$  is greater than 5 **and** less than or equal to 9

Circle the inequality that shows this.

$5 \leq x < 9$

$5 > x \geq 9$

$5 \leq x > 9$

$5 < x \leq 9$

(Total 1 mark)

## Q5

The length of a table is 110 cm to the nearest cm

Complete the error interval.

$$\underline{109.5} \text{ cm} \leq \text{length} < \underline{110.5} \text{ cm}$$

(Total 2 marks)

**Q20a**

$n$  is an odd number. = 1, 3, 5, 7, 9, 11, 13, 15, 17

$p$  is a prime number. = 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

In each part write down possible values of  $n$  and  $p$  so that

(a)  $n + p$  is a square number.

$$n = \underline{\quad 1 \quad} \quad p = \underline{\quad 3 \quad}$$

$$1 + 3 = 4$$

↙ square number

(Total 1 mark)

**Q20b**

$n$  is an odd number.

$p$  is a prime number.

In each part write down possible values of  $n$  and  $p$  so that

(b)  $np$  is a square number.

$$n = \underline{\quad 3 \quad} \quad p = \underline{\quad 3 \quad}$$

(Total 1 mark)

## Q16

A train has 1 first-class carriage and 6 standard carriages.

The first-class carriage has 64 seats.  
 $\frac{3}{8}$  are being used.  $\rightarrow 64 \times \frac{3}{8} = 24$  being used

Each standard carriage has 78 seats.  
 $\frac{7}{13}$  in each carriage are being used.  $\frac{7}{13} \times 78 = 42$  being used

Are **more than** half the seats on the train being used?

You **must** show your working.

$$\begin{aligned} \text{total number of seats} &= 64 + (6 \times 78) && \text{(Total 5 marks)} \\ &= 532 \end{aligned}$$

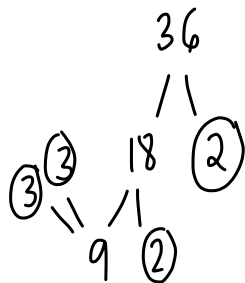
$$\text{seats being used} = 24 + (42 \times 6) = 276$$

$532 \div 2 = 266 < 276$  hence: yes, more than half the seats are being used

## Q5

Write 36 as a product of prime factors.

Give your answer in index form.



$$2^2 \times 3^2$$

(Total 3 marks)

## Q6

To the nearest pound, Jon has £9

To the nearest 50p, Ellie has £6.50

$$9.50 + 6.75 = \pounds 16.25$$

Work out the maximum possible total amount of money.

Answer £ 16.25

(Total 3 marks)

## Q23

In one hour a machine can make

600 nuts

or

720 bolts.

At 3 pm the machine starts working.

It makes 900 nuts and then changes to making bolts.

How many **bolts** will the machine make by 8 pm?

2520 bolts

(Total 4 marks)

- 600 nuts = 60 mins  
1 nut = 0.1 mins  
900 nuts = 90 minutes (1hr 30)  
→ by 4:30 pm

- 720 bolts = 60 mins  
12 bolts = 1 min  
2520 = 210 mins

## Q27

Work out  $\frac{9.12 \times 10^{10}}{3.2 \times 10^4}$

Give your answer in standard form.

$$(9.12 \div 3.2) \times (10^{10} \div 10^4)$$

$$\boxed{2.85 \times 10^6}$$

(Total 2 marks)

## Q8

Write down **all** the whole numbers that

are between 20 and 50

~~20, 24, 28, 32, 36~~, 40, 44, 48

and

have a difference of 4 between their digits.

(Total 2 marks)