

# Percentages (H)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

Name:	@MisthsNumeracy
Total Marks:	

1. (a) In an election, Stella gained 28 416 votes out of a total of 38 400 votes.

Write 28 416 as a percentage of 38 400.

$$\frac{28416}{38400} \times 100 = 74$$

74%

[2]

(b) Jake needs to find a selling price which is 12% more than £766.

Find the selling price.

$$12\% \text{ of } £766 = 0.12 \times 766 = £91.92$$

$$£766 + £91.92 = \underline{\underline{£857.92}}$$

[or  $1.12 \times 766 = 857.92$ ]

[2]

2. Circle the calculation that increases 400 by 7%

400 x 0.07

400 x 0.7

400 x 1.07

400 x 1.7

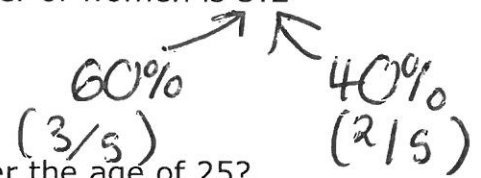
[1]

3. In a company, the ratio of the number of men to the number of women is 3:2

40% of the men are under the age of 25

10% of the women are under the age of 25

What percentage of all the people in the company are under the age of 25?



men: 40% of 60% =  $6 \times 4 = 24\%$

women: 10% of 40% = 4%

$24 + 4 = 28$  ..... 28% [4]

4. In 1999 the minimum wage for adults was £3.60 per hour.  
In 2013 it was £6.31 per hour.

Work out the percentage increase in the minimum wage.

$$\text{Increase in wages} = \pounds 6.31 - \pounds 3.60 = \pounds 2.71$$

$$\% \text{ increase} = \frac{2.71}{3.60} \times 100 = 75.3\% \text{ (1dp)}$$

.....% [3]

5. A shop has a sale that offers 20% off all prices.

On the final day they reduce all sale prices by 25%.

Alex buys a hairdryer on the final day.

Work out the overall percentage reduction on the price of the hairdryer.

$$0.8 \times 0.75 = \frac{8}{10} \times \frac{75}{100} = \frac{6}{10} = \frac{60}{100}$$

$$= 60\%$$

$$100 - 60 = 40$$

.....40.....% [6]

6. Kamile sells sandwiches.

In May, she sold 400 sandwiches.

In June, Kamile sold 20% more sandwiches than in May.

In July, Kamile sold 15% fewer sandwiches than in June.

Calculate the percentage change in her sales from May to July.

$$\text{June: } 20\% \text{ of } 400 = 40 \times 2 = 80$$

$$400 + 80 = 480$$

$$\text{July: } 15\% \text{ of } 480 = 48 + 24 = 72$$

$$480 - 72 = 408$$

$$408 - 400 = 8$$

$$\frac{8}{400} \times 100 = 2$$

.....2.....% [5]

7. In a school, 60% of the students are girls. *60% girls → 40% boys*

50% of the girls walk to school.

20% of the boys walk to school.

What percentage of the students walk to school?

*→ 50% of 60% = 30% (60 ÷ 2)      30% + 8% = 38%*  
*→ 20% of 40% = 8%*

[3]

8. A shop has a sale.

Microwave ovens  
 $\frac{1}{3}$  off normal price

Combination ovens  
 40% off normal price

A microwave oven has a sale price of £90 →  $\frac{1}{3}$  off  $\frac{2}{3} = £90$        $\frac{1}{3} = £45$   
 A combination oven has a sale price of £84       $\frac{3}{3} = 45 \times 3 = \underline{£135}$

Which of these ovens has the greater normal price?

You must show all your working.  $84 \div 6 = 14$        $6 \times 14 = 84$

*÷6 (60% = £84) ÷6  
 ↓ 10% = £14 ↓  
 ×10 (100% = £140) ×10*

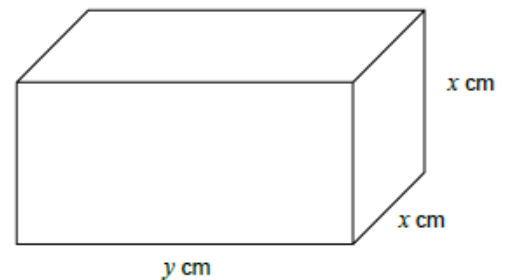
*combination oven has the greater normal price.*

[4]

9. A cuboid has dimensions x cm, x cm and y cm

*original volume =  $x \times x \times y$   
 =  $x^2 y$*

*New volume =  $1.1x \times 1.1x \times 0.8y$   
 =  $1.1 \times 1.1 \times 0.8 \times x^2 y$   
 =  $0.968x^2 y$*



x is increased by 10%  
 y is decreased by 20%

Work out and describe the percentage change in the volume of the cuboid.

*$1 - 0.968 = 0.032$  (3.2%)  
 There is a percentage reduction of 3.2%.*

[4]

10. Sophie sells birthday cards.

She adds 30% profit to the cost price.

She sells the cards for £2.34 each.

She wants to increase her profit to 40% of the cost price.

How much should she sell each card for?

$$\begin{aligned} \text{cost price} &= \pounds 2.34 \div 1.3 \\ &= \pounds 1.80 \end{aligned}$$

$$\pounds 1.80 \times 1.4 = \underline{\underline{\pounds 2.52}}$$

[3]

11. A ball is dropped from a height of 50 metres.

After each bounce, the ball reaches 20% of its previous height.

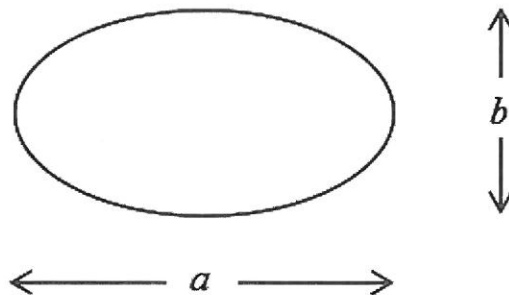
How high does it reach after the second bounce?

$$50 \times 1.2^2 = \underline{\underline{72 \text{ metres}}}$$

[2]

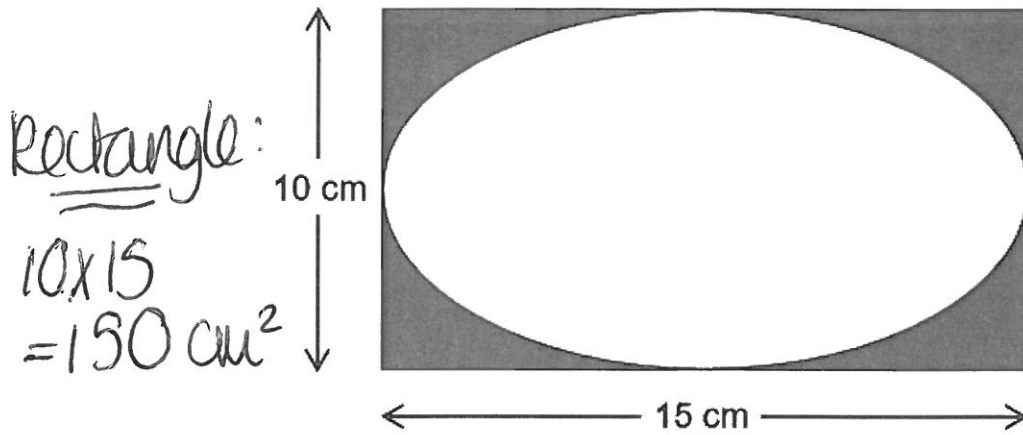
12. The area of an ellipse, width  $a$  and height  $b$ , is given by

$$\frac{\pi ab}{4}$$



A rectangular photograph measures 15 cm by 10 cm

It is put into a frame as shown.



Not drawn accurately

Ellipse:

$$\frac{\pi ab}{4} = \frac{\pi \times 15 \times 10}{4}$$

$$= 37.5 \pi \text{ cm}^2$$

The part of the photograph that can be seen is an ellipse.

Work out the percentage of the photograph that can be seen.

$$\frac{37.5 \pi}{150} \times 100 = \underline{\underline{78.5\%}} \text{ (1 dp)}$$

[3]

13. A doctor claims that the probability of having regular illness is doubled if you have poor sleep rather than good sleep.

In a survey, 16% of people with poor sleep had regular illness.

Here are the results for people with good sleep.

**Good Sleep**

	Number of people
Regular illness	24
Not regular illness	276

Comment on the doctor's claim. You must show your working.

$$\% \text{ with regular illness} = \frac{24}{(276+24)} \times 100 = \frac{24}{300} \times 100 = 8\%$$

$$8\% \times 2 = 16\%$$

[3]

The doctor's claim is correct.