

GCSE (9 – 1) Mathematics
J560/04 Paper 4 (Higher
Tier)

Question Set 4

Carol makes birthday cards.
Each card takes the same amount of time to make.

She makes 3 cards in 48 minutes.
She has an order for 80 cards.

Can she complete this order in 3 days if she works 8 hours each day?
Show how you decide.

$$26.6 \left(\begin{array}{l} 3c = 48 \\ 80c = 1280 \end{array} \right) 26.6$$

$$8 \times 60 = 480$$

$$480 \times 3 = 1440$$

- yes because it will take her 1280 mins
1. over the three days and there are 1440 mins available [5]
 $1440 > 1280$

Use the formula $F = \frac{s}{\sqrt{tm}}$ to find the value of F when

$$s = 5.8 \times 10^6$$

$$t = 4.1 \times 10^8$$

$$m = 3.7 \times 10^{-2}$$

Give your answer in standard form, correct to 2 significant figures.

$$\frac{5.8 \times 10^6}{\sqrt{(4.1 \times 10^8) \times (3.7 \times 10^{-2})}}$$
$$1489.139$$
$$\underline{1500} \dots \dots \dots [4]$$

2

3

At a railway station, trains are either eastbound or westbound.
An eastbound train leaves the station every 25 minutes.
A westbound train leaves the station every 45 minutes.

An eastbound train and a westbound train both leave the station at 8 am.

When is the next time that two trains leave the station together?

$$\text{LCM of } 25, 45 = 225 \text{ mins}$$

$$225 \div 60 = 3.75 \text{ hrs}$$

$$60 \times 0.75 = 45 \text{ min}$$

$$3 \text{ h } 45 \text{ m}$$

$$\underline{11.45 \text{ am}} \dots \dots \dots [4]$$

Multiply out and simplify.

$$(4x + y)(x - 3y)$$

Handwritten expansion of $(4x + y)(x - 3y)$ with arrows showing the multiplication process:

- 4x multiplied by x
- 4x multiplied by -3y
- y multiplied by x
- y multiplied by -3y

$$4x^2 - 12xy + xy - 3y^2$$
$$4x^2 - 11xy - 3y^2$$

4

$$\underline{\underline{4x^2 - 11xy - 3y^2}} \quad [3] \quad 5$$

A bag of sweets contains only mints, sherberts and toffees.

The ratio of the number of mints to sherberts is 2 : 3.

The ratio of the number of sherberts to toffees is 7 : 5.

What fraction of the sweets are sherberts?

$$2 : 3 \rightarrow \& \quad 7 : 5 \rightarrow \frac{14}{3} : 7 : 5$$
$$7 : 5 \rightarrow$$

$$\frac{3}{5} \times \frac{7}{12} = \frac{7}{20}$$

$$\frac{7}{20}$$

$$\underline{\underline{\hspace{10em}}} \quad [3]$$

Here is function A.



- (a) A number, k , is input into function A.
The output is also k .

Find the value of k .

$$\textcircled{1} \quad 3(k-4) = k \quad = 3k-12 = k \quad \textcircled{2}$$

$$\textcircled{2} \quad \frac{k}{3} + 4 = k \quad = 3k + 36 = 9k \quad \textcircled{4}$$

$$\textcircled{4} - \textcircled{3} = 48 = 8k$$

$$6 = k$$

(a) $k = \underline{\quad 6 \quad}$ [3]

(b)

6 (a)

The output of function A is y .

Write an algebraic expression, in terms of y , for the input of function A.

$$\text{input} = \frac{y}{3} + 4$$

(b) $\underline{\frac{y}{3} + 4}$ [2]

(c)

The diagram shows a composite function with an input, n , and an output of 96.



Find the value of n .

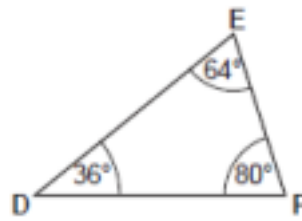
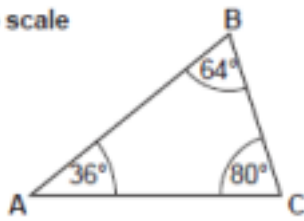
$$\left(\frac{96}{3}\right) + 4 = 36$$

$$\left(\frac{36}{3}\right) + 4 = 16$$

(c) $n = \underline{\quad 16 \quad}$ [2]

Are these two triangles definitely congruent?
Give a reason.

Not to scale

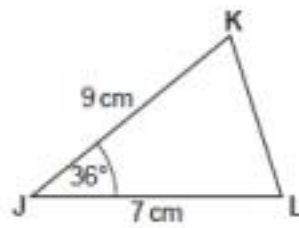
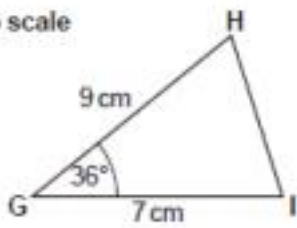


NO because it does not follow ASA, SAS, AAS rules. The triangles may be similar, but not congruent.

7 (a)

Prove that these two triangles are congruent.

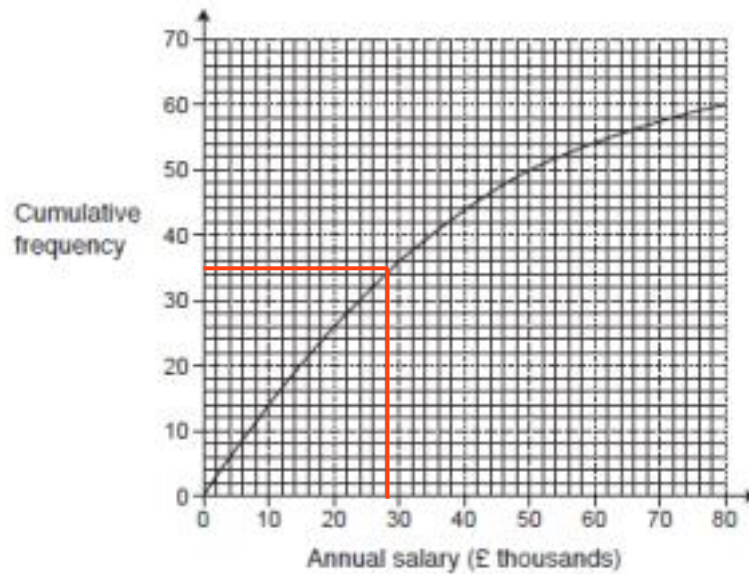
Not to scale



The side GH and JK are the same - this is given
Angle $\angle HGI$ & $\angle KJL$ are the same which is given. The side GI and JL are the same which is given
Therefore due to SAS the triangles are congruent.

[3]

The cumulative frequency graph summarises the annual salary, p (£ thousands), of the 60 workers in a factory.



(a) Use the graph to estimate the median annual salary.

(a) £ **28** thousands [1]

8 (a)

(b)

Complete this cumulative frequency table.

Annual salary, p (£ thousands)	Cumulative frequency	$A\bar{F}$	$p \times A\bar{F}$
$p < 10$	15	15	150
$p < 20$	26	11	220
$p < 30$	36	10	300
$p < 50$	50	14	700
$p < 80$	60	10	800

[2]

Use the information in the cumulative frequency table to calculate an estimate of the mean annual salary.

$$\text{Total} = 2170$$

$$\frac{2170}{60} = \underbrace{36.16}_{\text{mean}}$$

(c) £ 36.17 thousands [5] (d)

Explain why your estimate of the median is more reliable than your estimate of the mean.

because the line is not linear

[1]

9 (a)

(b)

10
Marks for Question Set 4: 50

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