**Answer ALL TWENTY THREE questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** The table gives information about the amount of crude oil, in barrels, produced per day by each of six countries in 2015

| Country | Crude oil produced per day (number of barrels) |
|---|---|
| Australia | 322 300 |
| Congo | 269 000 |
| Gabon | 213 300 |
| South Sudan | 220 000 |
| Thailand | 248 200 |
| Vietnam | 333 400 |

(a) Write down the name of the country that produced the least number of barrels of crude oil.

Gabon

(1)

(b) Work out the difference between the number of barrels of crude oil produced by Vietnam and the number of barrels of crude oil produced by Australia.

333400 322300

11100 barrels

(1)

Thailand produced 248 200 barrels of crude oil.

(c) Write 248 200 correct to the nearest thousand.

248000

(1)

**(Total for Question 1 is 3 marks)**

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**2** The pictogram shows information about the number of books sold in a shop each day from Monday to Thursday last week.

| | |
|---|---|
| **Monday** | 20 20 10 — 50 |
| **Tuesday** | 20 20 20 5 — 65 |
| **Wednesday** | 20 20 20 20 20 — 100 |
| **Thursday** | 20 20 20 20 5 — 85 |
| **Friday** | — 35 |

Key: ▯ represents 20 books

(a) How many books were sold on Wednesday last week?

100

**(1)**

35 books were sold in the shop on Friday last week.

(b) Show this information on the pictogram. ✓

**(1)**

Last week

some books were sold in the shop on Saturday
no books were sold in the shop on Sunday
a total of 500 books were sold in the shop.

(c) Work out the number of books that were sold in the shop on Saturday last week.

50 + 65 + 100 + 85 + 35 = 335

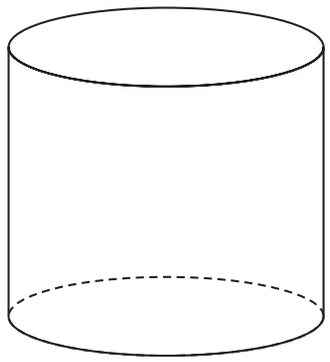
500 − (335) = 165

165

**(3)**

**(Total for Question 2 is 5 marks)**

**3** (a) Write down the mathematical name of this 3-D shape.



cylinder
(1)

Here is a solid cuboid.

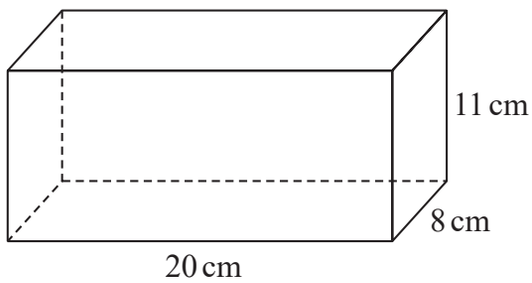



Diagram **NOT** accurately drawn

(b) (i) How many faces has the cuboid?

6

(ii) How many vertices has the cuboid?

8
(2)

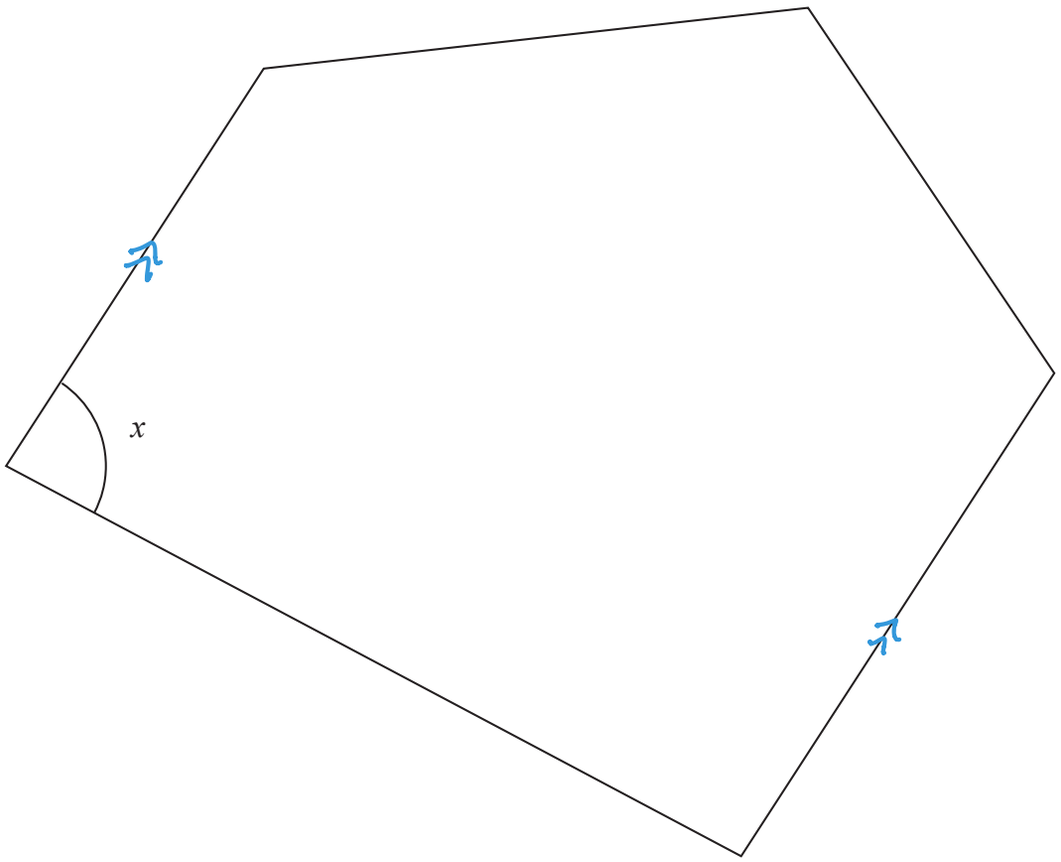
(c) Work out the volume of the cuboid.

11 x 8 x 20

1760 cm$^3$
(2)

**(Total for Question 3 is 5 marks)**

**4** Here is a polygon with five sides.




(a) Write down the mathematical name of a polygon with five sides.

pentagon

**(1)**

(b) Measure the size of the angle marked $x$.

85 °

**(1)**

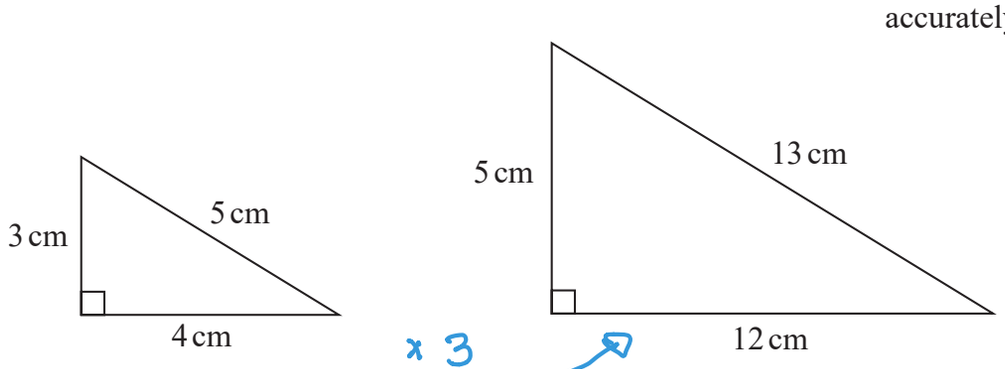
Two sides of the polygon are parallel.

(c) On the polygon, mark with arrows (>>) this pair of parallel lines.

**(1)**

Here are two triangles.

Diagram **NOT** accurately drawn




(d) Are triangle **A** and triangle **B** similar triangles?
You must give a reason for your answer.

no, the scale factor between all the sides is not the same.

**(1)**

**(Total for Question 4 is 4 marks)**

**5** Matt buys a notebook and some pencils.

The notebook costs \$2.35
Each pencil costs \$0.74

Matt has a total of \$20 to spend on the notebook and the pencils.
He buys the greatest number of pencils that he can.

Work out how many pencils he buys.

20 - 2.35 = 17.65
17.65 ÷ 0.74 = 23.85...
so 23 pencils

23

**(Total for Question 5 is 3 marks)**

**6** (a) Write $\frac{24}{40}$ as a fraction in its simplest form.

$\frac{12}{20} = \frac{6}{10} = \frac{3}{5}$

$\frac{3}{5}$

**(2)**

(b) Write $\frac{1}{5}$ as a decimal.

0.2

**(1)**

There are only blue bricks and white bricks in a box.
The ratio of the number of blue bricks to the number of white bricks is 3 : 7

(c) What fraction of the bricks in the box are blue bricks?

$\frac{3}{10}$

**(1)**

(d) Show that $\frac{3}{8} + \frac{1}{24} = \frac{5}{12}$

$\frac{3}{8} + \frac{1}{24}$

x3 ↓

$\frac{9}{24} + \frac{1}{24} = \frac{10}{24}$

$\frac{10}{24} = \frac{5}{12}$ as required.

**(2)**

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There are 280 counters in a bag.

$\frac{1}{2}$ of the counters are red.

$\frac{2}{5}$ of the counters are yellow.

The rest of the counters are green.

(e) Work out the number of green counters in the bag.

280

R = $\frac{1}{2}$ = 140

4 : $\frac{2}{5}$ = 112

G = 280 - (140 + 112)
= 28

28

(3)

**(Total for Question 6 is 9 marks)**

**7** (a) Simplify $5c \times d$

5cd

(1)

(b) Solve $x + 5 = 12$

−5 −5

$x =$ 7

(1)

(c) Solve $9y = 36$

÷9 ÷9

$y =$ 4

(1)

(d) Simplify $8k + 5m - 2k + 6m$

8k - 2k + 5m + 6m

= 6k + 11m

6k + 11m

(2)

(e) Expand $4(3g + 1)$

4 x 3g = 12g

4 x 1 = 4

12g + 4

(1)

**(Total for Question 7 is 6 marks)**

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**8** Pavel asked 60 people at an airport where they came from.
All of the 60 people came from Europe or Africa or Asia.

9 people came from Africa.
14 females came from Europe.
3 males came from Africa.
16 of the 29 males came from Asia.

Using this information, complete the two-way table.

29 - 19

| | Europe | Africa | Asia | Total |
|---|---|---|---|---|
| **Male** | 10 | 3 | 16 | 29 |
| **Female** | 14 | 6 | 11 | 31 |
| **Total** | 24 | 9 | 27 | 60 |

60 - 29

10 + 14

9 - 3

**(Total for Question 8 is 4 marks)**

**9** $c = 4$
$d = 7$

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

$3 \times 4 + 2 \times 7$

$= 12 + 14$

26

**(2)**

$p = -6$
$m = -2$

(b) Work out the value of $2p^2 + 3m$

$2 \times (-6)^2 + 3 \times (-2)$

$= 2 \times 36 - 6$

$= 72 - 6$

66

**(2)**

There are 6 eggs in a small box of eggs.
There are 12 eggs in a large box of eggs.

Alex buys $g$ small boxes of eggs and $h$ large boxes of eggs.
He buys a total of $T$ eggs.

(c) Write down a formula for $T$ in terms of $g$ and $h$.

$T = 6g + 12h$

$T = 6g + 12h$

**(3)**

**(Total for Question 9 is 7 marks)**

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**10** (a) Use your calculator to work out the value of $\frac{67.8 + 4.6^2}{\sqrt{56}}$

Write down all the figures on your calculator display.

11.88778004

**(2)**

(b) Give your answer to part (a) correct to 2 significant figures.

12

**(1)**

**(Total for Question 10 is 3 marks)**

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**11** A circle has radius 18 cm.

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

$r = 18$ $D = 36$

$C = \pi \times 36$

$= 113.097...$

113 cm

**(Total for Question 11 is 2 marks)**

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**12** Gavin bought 3 pairs of jeans in the USA.
He paid a **total** of $72

Gavin sold the 3 pairs of jeans in England.
He sold each pair of jeans for £34.50

£1 = $1.34

Work out Gavin's percentage profit.
Give your answer correct to the nearest whole number.

USA

$72

÷1·34

= £53·73

UK.

34·50 x 3

= £103·50

Profit = 103·50 - 53·73

= 49·77

% = $\frac{49·77}{53·73}$ x 100

= 92·56..

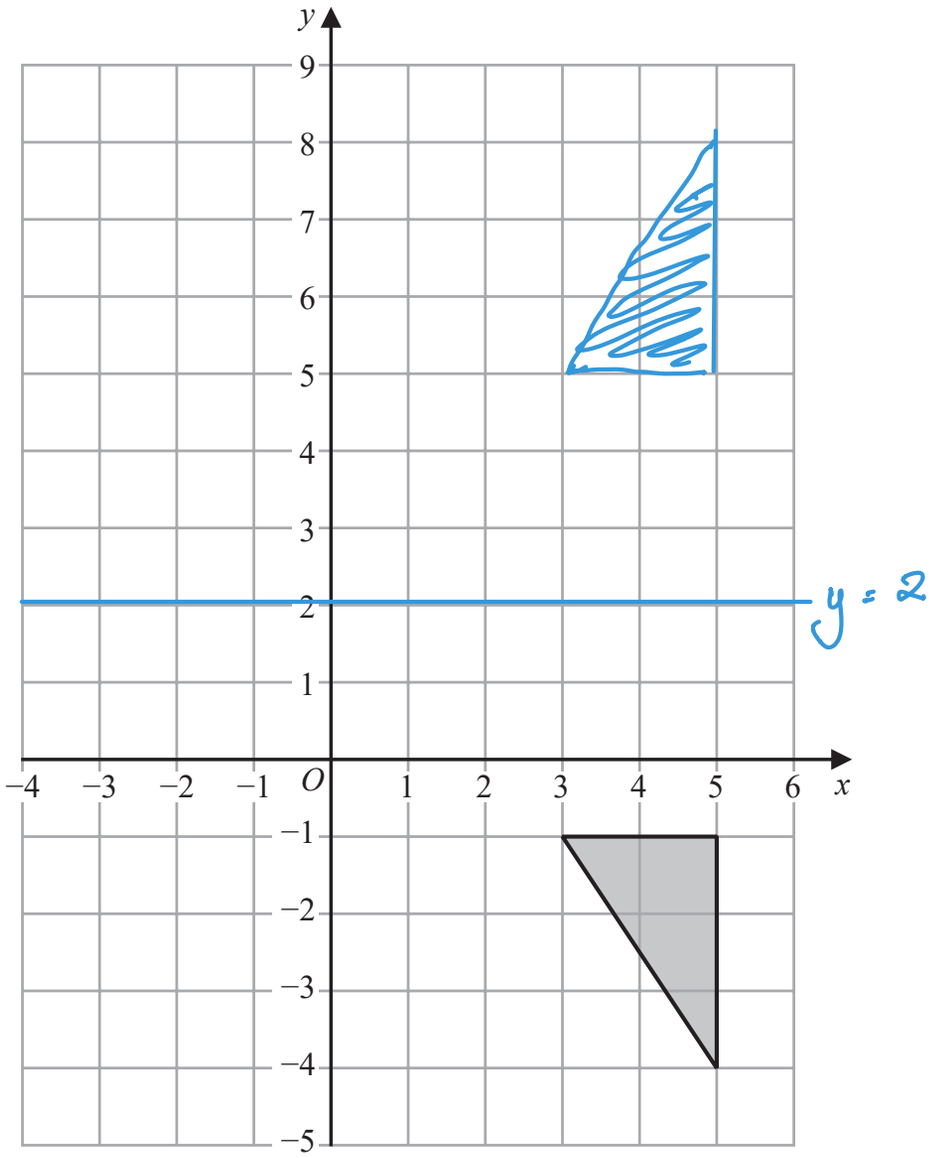
↑

(whole number)

93 %

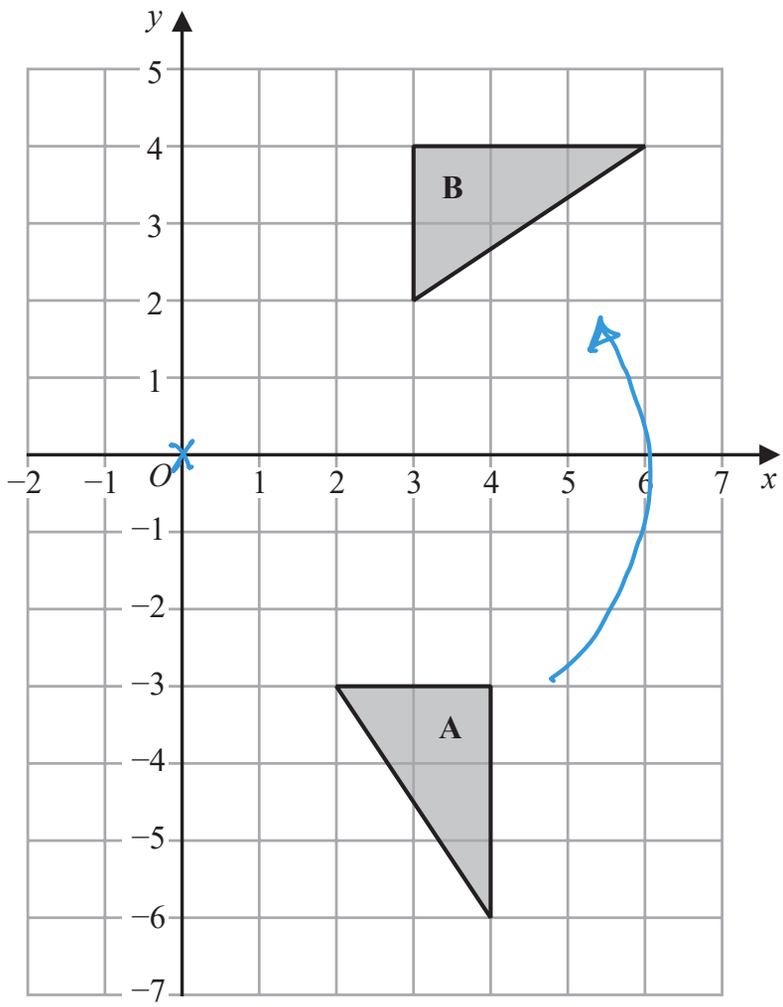
**(Total for Question 12 is 4 marks)**

**13**




(a) On the grid, reflect the shaded triangle in the line with equation $y = 2$

**(2)**



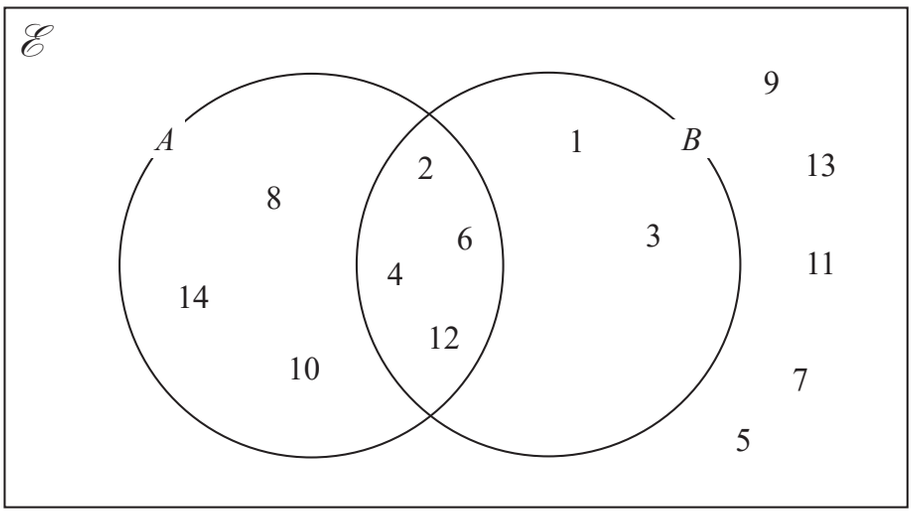

(b) Describe fully the single transformation that maps triangle **A** onto triangle **B**.

**(3)**

Rotation, 90° anti clockwise, centre O

**(Total for Question 13 is 5 marks)**

**14** The numbers from 1 to 14 are shown in the Venn diagram.




(a) List the members of the set $A \cap B$

2, 4, 6, 12

**(1)**

(b) List the members of the set $B'$

5, 7 8 9 10 11 13 14

**(1)**

A number is picked at random from the numbers in the Venn diagram.

(c) Find the probability that this number is in set $A$ but is **not** in set $B$.

$\frac{3}{14}$

**(2)**

**(Total for Question 14 is 4 marks)**

**15** Toy cars are made in a factory.
The toy cars are made for 15 hours each day.
5 toy cars are made every 12 seconds.

For the toy cars made each day, the probability of a toy car being faulty is 0.002

Work out an estimate of the number of faulty toy cars that are made each day.

5 = 12 seconds
x5 ↓ 25 = 1 min
x60 ↓ 1500 = 1 hr
x15 ↓ 22500 = 15 hours

x 5
x 60
x 15

Estimate: $0.002 \times 22500$

45

**(Total for Question 15 is 4 marks)**

**16** On the grid, draw the graph of $y = 7 - 4x$ for values of $x$ from $-2$ to $3$

$x = -2$

$y = 7 - 4x - 2$

$= 7 + 8$

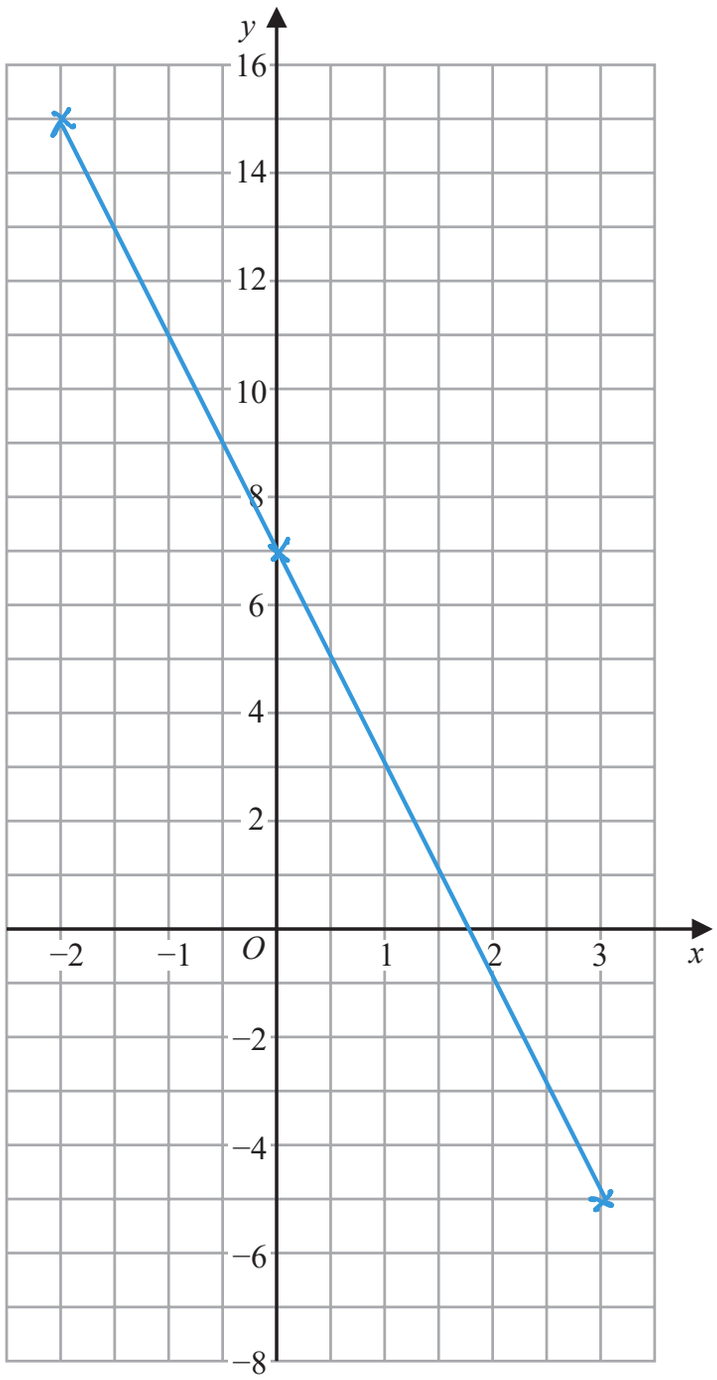
$= 15$

$x = 3$

$y = 7 - 4 \times 3$

$= 7 - 12$

$= -5$




**(Total for Question 16 is 3 marks)**

**17** Here is a list of six numbers written in order of size.

4 7 $8x$ 9 10 $y$ $y$

The numbers have

a median of 9
a mean of 11

Find the value of $x$ and the value of $y$.

median of 9 means $x = 8$

mean of 11 means total = 66

$66 - (4 + 7 + 8 + 10)$

$= 66 - 29$

$= 37$

$2y = 37$

$y = 18.5$

$x =$ 8

$y =$ 18.5

**(Total for Question 17 is 4 marks)**

**18** (a) Write $5.7 \times 10^{-3}$ as an ordinary number.

0·0057

(1)

(b) Write 800 000 in standard form.

$8 \times 10^5$

(1)

(c) Work out $\dfrac{3 \times 10^5 - 2.7 \times 10^4}{6 \times 10^{-2}}$

$\frac{273000}{6 \times 10^{-2}}$

$= 4550000$

$4.55 \times 10^6$

(2)

**(Total for Question 18 is 4 marks)**

**19** A rocket travelled 100 km at an average speed of 28 440 km/h.

Work out how long it took the rocket to travel the 100 km.
Give your answer in seconds, correct to the nearest second.

28440 km = 3600s

÷28440 ↓ 1 km = 0·1265.. ↓ ÷28440

x100 ↓ 100km = 12·658.. ↓ x100

↑ nearest second

13 seconds

**(Total for Question 19 is 3 marks)**

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**20** (a) Solve $5(4 - x) = 7 - 3x$
Show clear algebraic working.

$20 - 5x = 7 - 3x$
$+5x \quad +5x$

$20 = 7 + 2x$
$-7 \quad -7$

$13 = 2x$

$x = \frac{13}{2}$

$x =$ 6.5

**(3)**

(b) Factorise fully $16m^3g^3 + 24m^2g^5$

$8m^2g^3(2m + 3g^2)$

**(2)**

(c) (i) Factorise $y^2 - 2y - 48$

1, 48 2, 24 3, 16 4, 12 6, 8
6 − 8

$(y + 6)(y - 8)$

**(2)**

(ii) Hence, solve $y^2 - 2y - 48 = 0$

$(y + 6)(y - 8) = 0$

$y = -6 \quad y = 8$

**(1)**

**(Total for Question 20 is 8 marks)**

**21** Here is a 10-sided polygon.

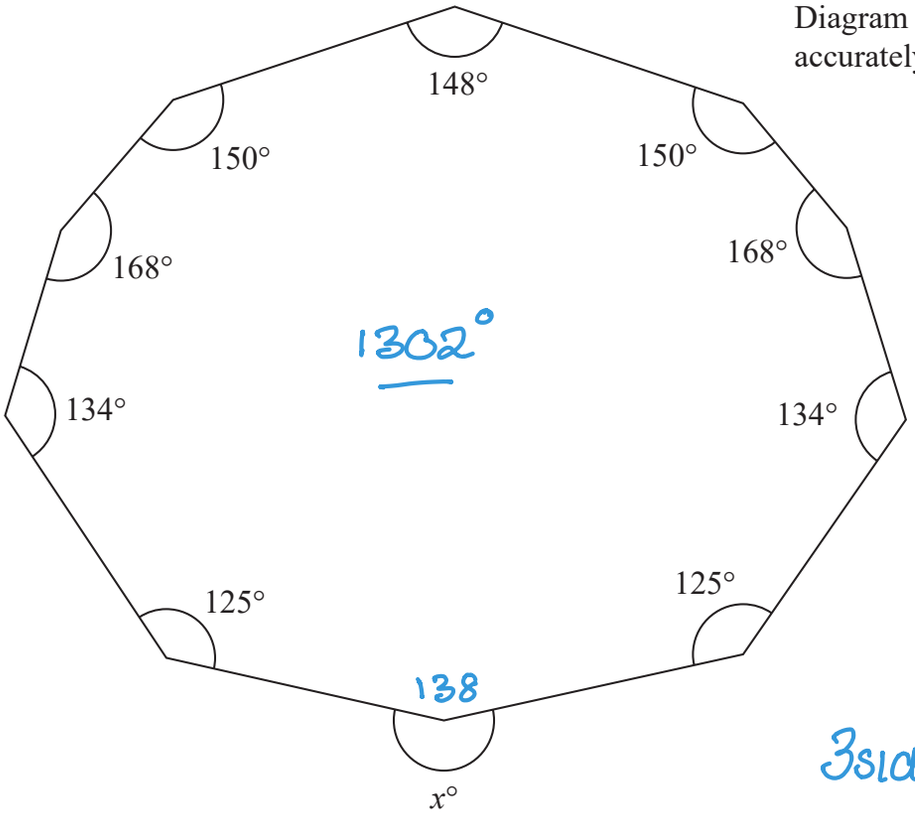


Diagram **NOT** accurately drawn

Work out the value of $x$.

1440 - 1302 = 138

360 - 138 = 222

3 sides = 180
4 = 360
5 = 540
6 = 720
7 = 900
8 = 1080
9 = 1260
10 = 1440

$x =$ 222

**(Total for Question 21 is 4 marks)**

**22** In a sale, normal prices are reduced by 20%

A bag costs 1080 rupees in the sale.

Work out the normal price of the bag.

80% = 1080

÷80 ↓ ↓ ÷80

1% = 13·5

×100 ↓ ↓ ×100

100% = 1350

1350 rupees

**(Total for Question 22 is 3 marks)**

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**23** $A = 2 \times 3^{43}$
$B = 16 \times 3^{37}$

(a) Find the highest common factor (HCF) of $A$ and $B$.

$A = 2 \times 3^{43}$

$B = 2^4 \times 3^{37}$

$HCF = 2 \times 3^{37}$

$2 \times 3^{37}$

**(1)**

(b) Express the number $A \times B$ as a product of powers of its prime factors. Give your answer in its simplest form.

$A \times B = 2 \times 3^{43} \times 2^4 \times 3^{37}$

$= 2^5 \times 3^{80}$

$2^5 \times 3^{80}$

**(2)**

**(Total for Question 23 is 3 marks)**

**TOTAL FOR PAPER IS 100 MARKS**

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