Model Solutions

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | Candidate Number

Monday 7 January 2019

Morning (Time: 2 hours) | Paper Reference **4MA1/1F**

Mathematics A

Level 1/2
Paper 1F
Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – there may be more space than you need.
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

P59016A

1/1/1/

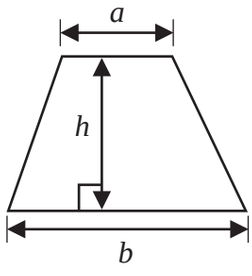
P 5 9 0 1 6 A 0 1 2 4

Pearson

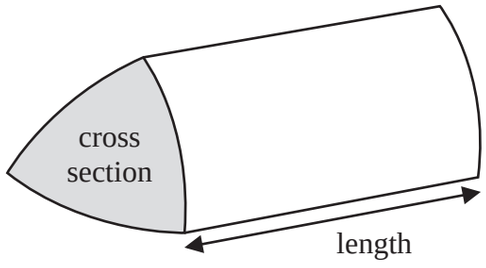
International GCSE Mathematics

Formulae sheet – Foundation Tier

Area of trapezium = $\frac{1}{2}(a + b)h$

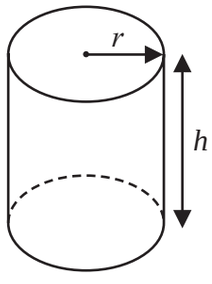


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write these numbers in order of size.
Start with the smallest number.

73	138	36	219	89
(2)	(4)	(1)	(5)	(3)

36 73 89 138 219

(1)

(b) Write in figures the number two thousand and eighteen.

2000
18
2018

two thousand and eighteen

(1)

(c) Write in words the number 4309

4000
300
9
4309

Four thousand three hundred and nine

(1)

(d) Write down the value of the 7 in 9715

×10 ×1 ×100

7 × 100 = 700

(1)

(e) Write the number 286 correct to the nearest 10

↳ 6 > 5 ∴ round up

290

(1)

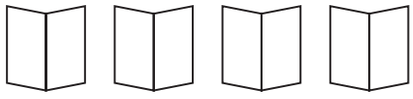
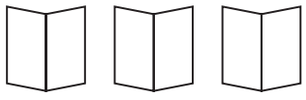
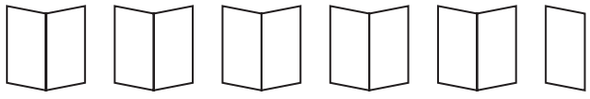
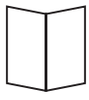
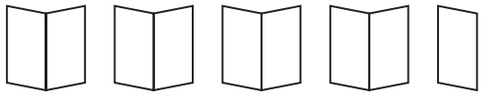
(f) Work out $\frac{4}{5}$ of 185

$\frac{4}{5} \times 185 = 4 \times \frac{185}{5} = 4 \times 37 = 148$

(2)

(Total for Question 1 is 7 marks)

2 The pictogram shows some information about the number of books read by Theodore during each of five weeks.

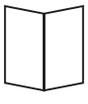
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	

(a) During which week did Theodore read the greatest number of books?

Week 3

(1)

Theodore read 16 books during Week 1

(b) (i) How many books does  represent?

$16 \leftarrow 4 \times x$ ÷4

$4 \leftarrow x$

(ii) How many books did Theodore read during Week 2?

$3 \times x = 3 \times 4 = 12$

(iii) How many books did Theodore read during Week 5?

$4.5 \times x = 4.5 \times 4 = 18$

(3)

(Total for Question 2 is 4 marks)

3 Here is a sequence of patterns made from identical pentagons.

Pattern number 1 | Pattern number 2 | Pattern number 3

(a) (i) Work out the number of pentagons in Pattern number 4

x added in next pattern

$10 + 4 = 14$

(ii) Explain how you worked out your answer.

The next pattern adds 4 pentagons to the current pattern.

(2)

A different sequence of patterns is made from identical hexagons.
The rule below can be used to find the number of hexagons in each pattern of this sequence.

Multiply the Pattern number by 5 and subtract 1

(b) Work out the number of hexagons in Pattern number 7

n^{th} term: $5n-1$

7^{th} term: $5(7)-1 = 35-1 = 34$

(1)

A pattern in this sequence has exactly 59 hexagons.

(c) Work out its Pattern number.

$5n-1 = 59$ (+1)

$5n = 60$ (÷5)

$n = 12$

(2)

(Total for Question 3 is 5 marks)

4 Megan buys 2 muffins and 1 carrot cake.
The total cost is £4.74

The cost of the carrot cake is £1.80

Muffins - m

carrot cake - c

(a) Find the cost of each muffin.

$2m + c = £4.74 \qquad c = £1.80$

$2m + £1.80 = £4.74$ $\quad -£1.80$

$2m = £2.94$ $\quad \div 2$

$m = £1.47$

£ 1.47

(3)

Caitlin buys some apples and some oranges.
She buys twice as many apples as oranges.

Each apple costs £0.25 → a
Each orange costs £0.30 → o

Caitlin has £5 to spend.

(b) Find the greatest number of apples she can buy.

cost of 1 set { 2 x £0.25 = £0.50 [apples]; 1 x £0.30 = £0.30 [oranges]

For 2a and o : £0.50 + £0.30 = £0.80

£5 ← n x £0.80

$\frac{5}{0.8}$ ← n ← How many sets she can purchase

6.25 ≈ 6

∴ 6 sets : 6×2 apples = 12 apples

(3)

(Total for Question 4 is 6 marks)

5 The table shows information about the number of gold medals won by each of 8 countries at the 2016 Olympics.

Country	Number of gold medals
China	26
France	10
Germany	17
Great Britain and Northern Ireland	27
Japan	12
Russia	19
South Korea	9
United States	46

(a) Work out the range of the number of gold medals.

largest − smallest.

$46 - 9 = 37$

(1)

(b) Work out the median number of gold medals.

In ascending order : 9 10 12 17 19 26 27 46 (18 ↓)

$\frac{n+1}{2}$ th $= \frac{8+1}{2} = 4.5$ $\quad \frac{4\text{th} + 5\text{th}}{2} = \frac{17+19}{2}$

$= \frac{36}{2} = 18$

(2)

(c) Work out the mean number of gold medals.

Sum of all the medals Σx / no. of countries n

$= \frac{26+10+17+27+12+19+9+46}{8}$

$= \frac{166}{8} = 20.75$

(2)

(Total for Question 5 is 5 marks)

6 Sabbir arrived at Dhaka train station at 9 30 pm.

(a) Write this time using the 24-hour clock.

21 30

9 30 + 1200 pm

(1)

A train left Dhaka train station at 10 30 pm one day.
The train arrived at Chittagong train station at 7 50 am the next day.

(b) Work out the time taken by this train.
Give your answer in hours and minutes.

calculating morning and night seperately

7 50 am − 0 00 am ← same → 12 00 pm − 10 30 pm

7 50 + 1 30 => 7 + 1 hr = 8 hr

50 + 30 min = 80 min

8 hr + (60 + 20) min

1 hour

9 hours 20 minutes

(2)

A different train travelled from Dhaka to Darshana.

The train took 5 hours and 30 minutes.
The train travelled a distance of 327 kilometres.

(c) Work out the average speed of the train.
Give your answer in kilometres per hour correct to the nearest whole number.

Average speed = Total distance / Total time = 327 / 5.5 = 59.45

4 < 5 ∴ round down

≈ 59

5hr 30 min → 5.5 hr

30/60 hr = 0.5 hr

59 km/h

(3)

(Total for Question 6 is 6 marks)

7 (a) Write down the prime number between 90 and 100

97

$91 \div 7 = 13$
$92 \div 2 = 46$
$93 \div 3 = 31$
$94 \div 2 = 47$
$95 \div 5 = 19$

$96 \div 2 = 48$
$97 \div 1 = 97$ ← prime as it can only be divided by 1 and itself.
$98 \div 2 = 49$
$99 \div 3 = 33$

(1)

(b) Find the value of 3^6

$3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729$

$9 \times 9 \times 9$

81×9

Easiest to put into the calculator.

(1)

(c) Find the cube root of 6859

19

Easiest to put into the calculator

(1)

(d) (i) Work out the value of $\dfrac{\sqrt{8.4 + 9.1^2}}{4.1 \times 0.6}$

Write down all the figures on your calculator display.

Put into calculator :

$$\frac{\sqrt{91.21}}{2.46} = 3.88227344$$

(2)

(ii) Write your answer to part (d) (i) correct to 1 decimal place.

$3.88227 \approx 3.9$

↳ $8 > 5$ ∴ round up

(1)

(Total for Question 7 is 6 marks)

8 (a) Simplify $2e - 3f + 4e - 7f$

$2e + 4e - 3f - 7f$

$6e - 10f$

(2)

(b) Expand and simplify $5(4x + 3) - (3x - 1)$

$20x + 15 - 3x + 1$

$20x - 3x + 15 + 1$

$17x + 16$

bring the x's and the constants together →

(2)

(c) Factorise fully $4p + 6pq$

$2p(2 + 3q)$

↑ Take the common denominator out

(2)

(Total for Question 8 is 6 marks)

9 $h = 6q - 2u$

(a) Work out the value of h when $q = 3$ and $u = -5$

Substitute $q=3$ and $u=-5$:

$h = 6(3) - 2(-5)$

$= 18 + 10 = 28$

$h =$ 28

(2)

$B = 3m + 2p$

(b) Work out the value of p when $B = 2$ and $m = 5$

Substitute $B=2$ and $m=5$

$2 = 3(5) + 2p$

$2 = 15 + 2p$

$-13 = 2p$

$-6.5 = p$

$p =$ -6.5

(2)

(Total for Question 9 is 4 marks)

10 All the teachers at a school are either left footed or right footed.
At the school

the number of left footed teachers : the number of right footed teachers = 3 : 13

A teacher at the school is picked at random.

(a) Find the probability that this teacher is left footed.

no. of left footed → $\frac{3}{3+13} = \frac{3}{16}$

Total no. of teachers →

(1)

At the school, there are 18 left footed teachers.

(b) How many right footed teachers are there?

teachers	ratio
18	3 ÷3
6	1 ×13
x	13

3 : 13
↑ ↑
left Right

$x = 6 \times 13 = 78$

(2)

(Total for Question 10 is 3 marks)

11 Benson was on holiday in Kenya for 70 days.

He was in Nairobi for $\frac{2}{7}$ of this holiday.

He was in Mombasa for $\frac{1}{5}$ of this holiday.

He was in Kisumu for $\frac{4}{9}$ of the **rest** of this holiday.

For what fraction of this holiday was Benson in Kisumu?

In Nairobi $= \frac{2}{7} \times 70 = 2 \times \frac{70}{7} = 2 \times 10 = 20$ days

In Mombasa $= \frac{1}{5} \times 70 = 14$ days

Rest of holiday $= 70 - (20 + 14) = 70 - 34 = 36$ days

(70 ↑ Total holiday; (20 + 14) ↑ Spent in Nairobi and Mombasa)

In Kisumu $= \frac{4}{9} \times 36 = 4 \times 4 = 16$ days

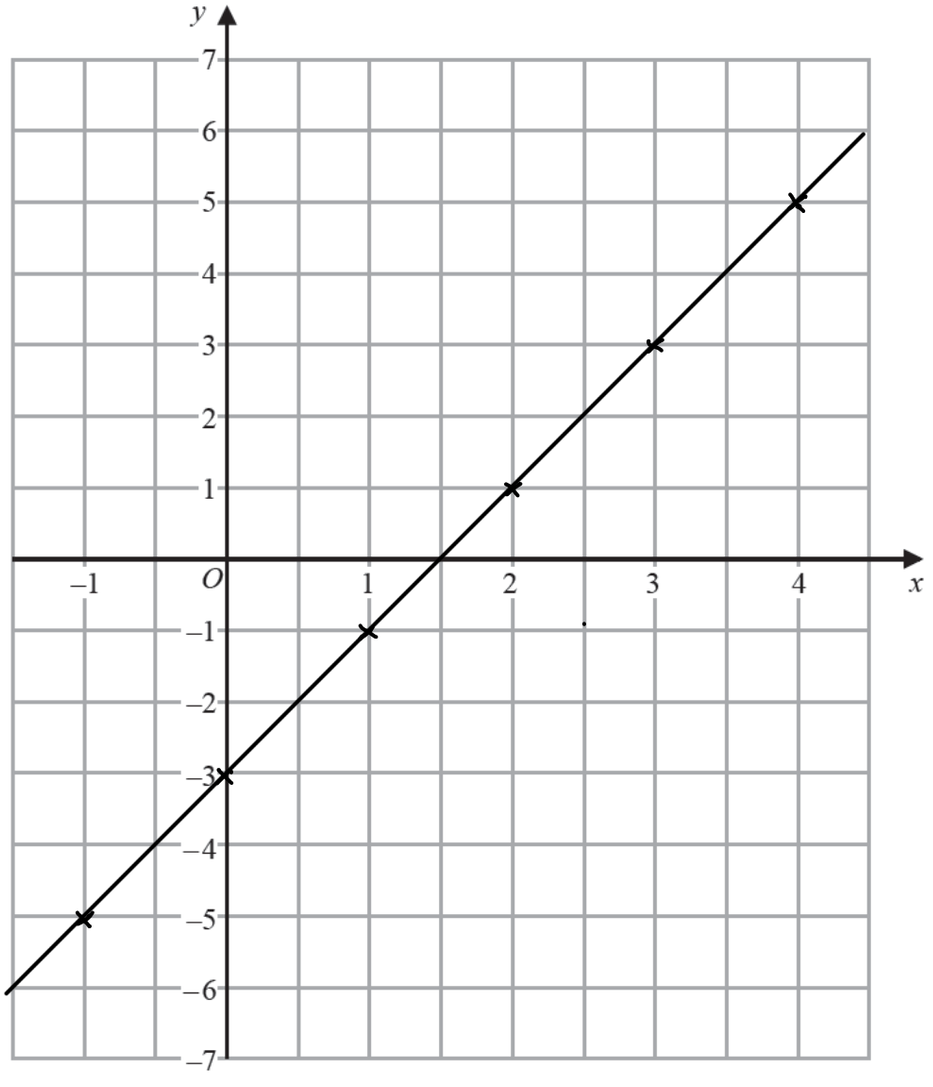
(36 ↑ rest of the holiday.)

As a fraction $= \frac{16}{70}$ ← days in Kisumu ← Total days.

(Total for Question 11 is 4 marks)

12 On the grid, draw the graph of $y = 2x - 3$ for values of x from -1 to 4

x	-1	0	1	2	3	4
$2x-3$	-5	-3	-1	1	3	5



(Total for Question 12 is 3 marks)

13 (a) Expand and simplify $(e + 3)(e - 5)$

$e^2 - 5e + 3e - 15$

$e^2 - 2e - 15$

(2)

(b) Solve $y = \frac{2y + 1}{5}$

Show clear algebraic working.

$y = \frac{2y+1}{5}$ ×5

$5y = 2y + 1$ −2y

$3y = 1$ ÷3

$y = \frac{1}{3}$

$y = \frac{1}{3}$

(3)

(c) Solve $x^2 + 3x - 18 = 0$

Show your working clearly.

$-3 \times 6 = -18$ (1)

$-3 + 6 = 3$ (2)

$x^2 - 3x + 6x - 18 = 0$

$x(x - 3) + 6(x - 3) = 0$

$(x + 6)(x - 3) = 0$

$x + 6 = 0$ OR $x - 3 = 0$

$x = -6$ $x = 3$

(3)

(Total for Question 13 is 8 marks)

14 The table gives information about the price of gold.

	1st February 2016	1st March 2016
Price of one ounce of gold (dollars)	1126.50	1236.50

(a) Work out the percentage increase in the price of gold between 1st February 2016 and 1st March 2016
Give your answer correct to 3 significant figures.

Change in price = $1236.50 − $1126.50 = $110

Change as a % = $\frac{\$110}{\$1126.50} \times 100 = 9.76476\%$

↳ 4<5 round down

$\approx 9.76\%$ (3 sf)

9.76 %

(3)

The price of one ounce of gold on 1st February 2016 was 1126.50 dollars.
The price of gold increased by 19% from 1st February 2016 to 1st July 2016

(b) Work out the price of one ounce of gold on 1st July 2016
Give your answer correct to the nearest dollar.

Gold price as a %

Feb: 100% → $1126.50

July: 100% + 19% (↑ Increase) → $?

July price = $\frac{119}{100} \times 1126.50 = 1340.535$

≈ 1341 (nearest dollar)

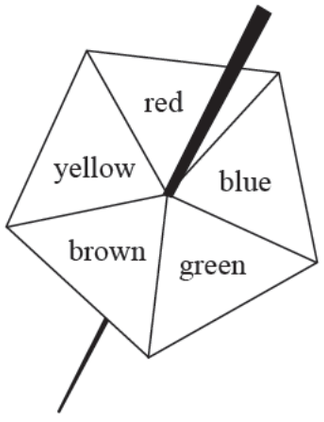
1126.50 → 100
x → 119

1341 dollars

(3)

(Total for Question 14 is 6 marks)

15 Here is a biased 5-sided spinner.



Kenny spins the spinner once.
The table gives the probabilities that the spinner lands on red or on blue or on green.

Colour	red	blue	green	brown	yellow
Probability	0.15	0.26	0.33		

(a) Work out the probability that the spinner lands on red or blue.

P(red or blue) = P(red) + P(blue)

P(red or blue) = 0.15 + 0.26 = 0.41

(1)

When the spinner is spun once, the probability that the spinner lands on brown is 0.06 more than the probability that the spinner lands on yellow.

Jenine spins the spinner 150 times.

(b) Work out an estimate for the number of times the spinner lands on yellow.

P(brown) = $x + 0.06$ P(yellow) = x

P(total) = P(red) + P(blue) + P(green) + P(brown) + P(yellow)

$1 = 0.15 + 0.26 + 0.33 + x + 0.06 + x$

$1 = 0.8 + 2x \Rightarrow 2x = 0.2 \Rightarrow x = 0.1$

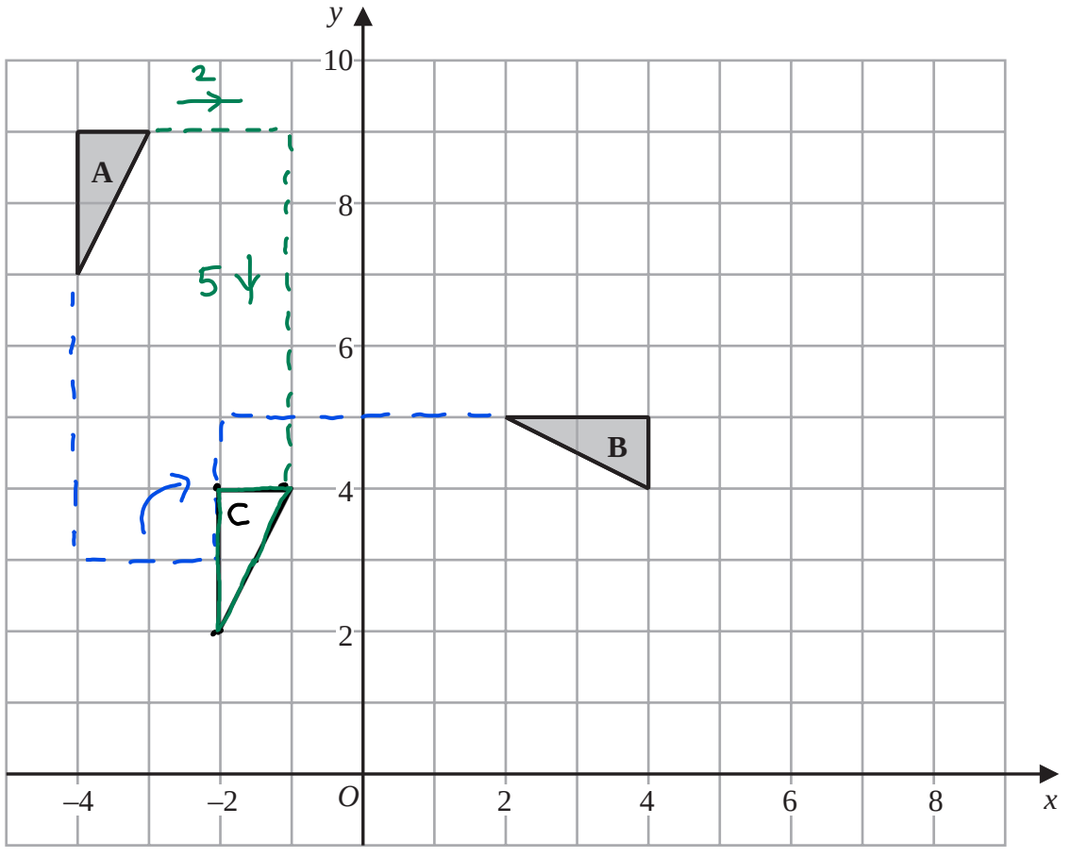
$\therefore$ P(yellow) $= x = 0.1$

For 150 times: $150 \times 0.1 = 15$ times.

(4)

(Total for Question 15 is 5 marks)

16



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

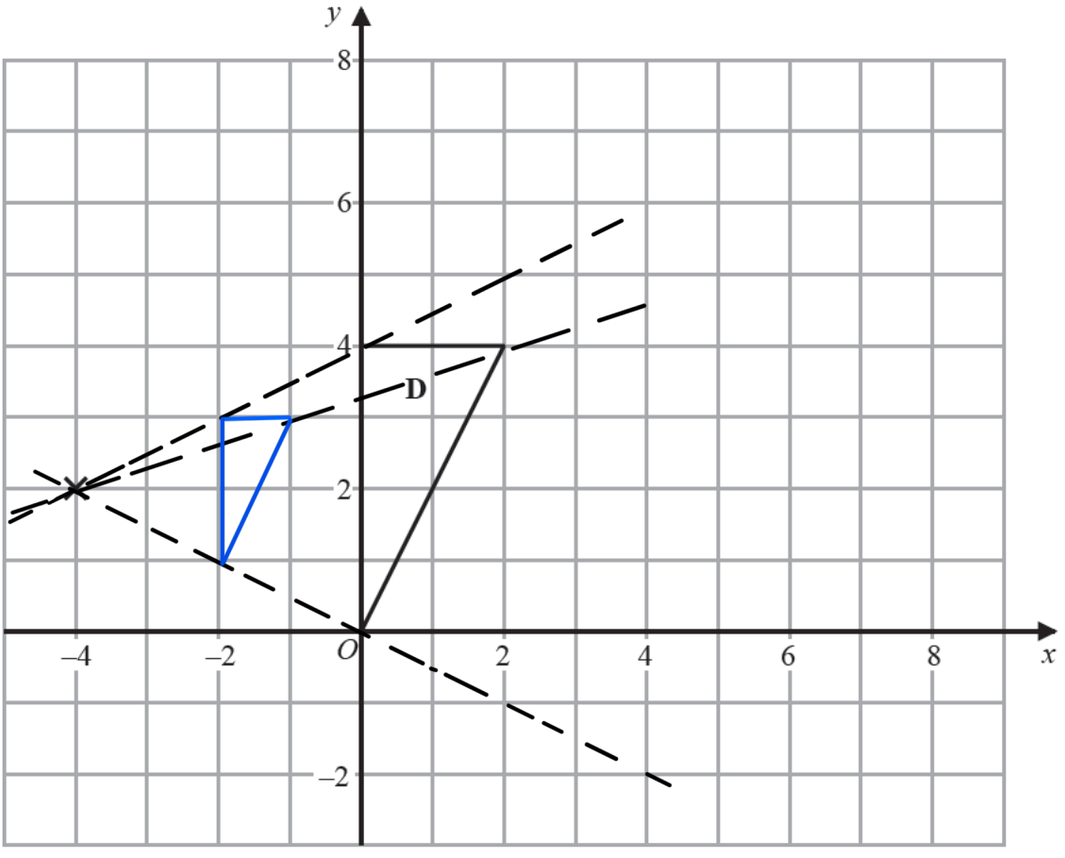
Rotation, 90° clockwise about (−2, 3)

(3)

(b) On the grid, translate triangle **A** by the vector $\begin{pmatrix} 2 \\ -5 \end{pmatrix}$

Label the new triangle **C**.

(1)



(c) On the grid, enlarge triangle **D** with scale factor $\frac{1}{2}$ and centre $(-4, 2)$

(2)

(Total for Question 16 is 6 marks)

17 The diagram shows an isosceles triangle ABC and a semicircle with centre O and diameter 12 cm.

The point B lies on the semicircle.

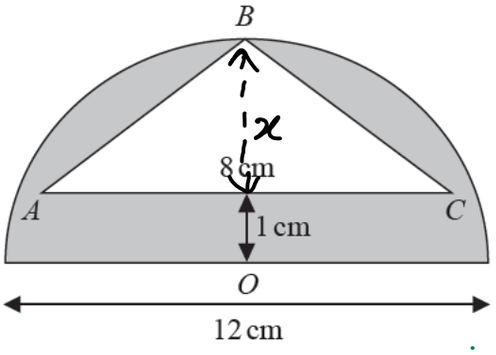


Diagram **NOT** accurately drawn

The line OB is the line of symmetry of the diagram.

AC is 1 cm from the diameter of the semicircle and $AC = 8$ cm.

Work out the area of the shaded region.
Give your answer correct to 3 significant figures.

$x + 1\text{ cm} = 6\text{ cm}$ (radius of the circle)

$x = 5\text{ cm}$ $\left(\frac{1}{2} \times 12 = 6\right)$ ↑ diameter

Area of semicircle $= \frac{1}{2} \times \pi \times r^2$

$= \frac{1}{2} \times \pi \times 6^2 = 18\pi\ \text{cm}^2$

Area of triangle $= \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 8 \times 5 = 20\ \text{cm}^2$

Shaded area = area of semicircle − area of triangle

$= 18\pi - 20\ \text{cm}^2 = 36.549$

↳ 4<5 round down

36.5 cm²

(Total for Question 17 is 4 marks)

18 The table shows the volumes, in km^3, of four oceans.

Ocean	Volume (km^3)
Arctic Ocean	1.88×10^7
Atlantic Ocean	3.10×10^8
Indian Ocean	2.64×10^8
Southern Ocean	7.18×10^7

(a) Write 7.18×10^7 as an ordinary number.

71800000

(1)

(b) Calculate the total volume of these four oceans.

① convert all values to 10^7

$3.10 \times 10^8 = 3.1 \times 10 \times 10^7$
$= 31 \times 10^7$

$$\begin{array}{rl} & 1.88 \times 10^7 \\ + & 31.00 \times 10^7 \\ + & 26.40 \times 10^7 \\ + & 7.18 \times 10^7 \\ \hline & 66.46 \times 10^7 \end{array} \Rightarrow 6.646 \times 10^8$$

divide by 10 and raise the power of '10' by 1

km^3 **(2)**

The volume of the South China Sea is 9 880 000 km^3

(c) Write 9 880 000 in standard form.

9.88×10^6

Should be a value between 0 and 10.

(1)

(Total for Question 18 is 4 marks)

19

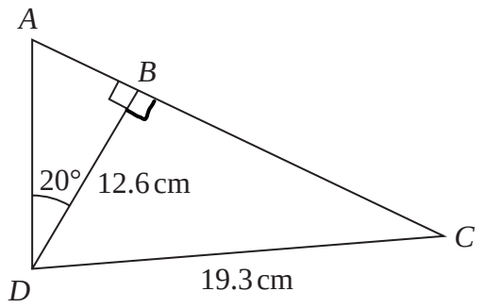


Diagram **NOT** accurately drawn

ABC is a straight line.

Work out the length of *AC*.
Give your answer correct to 1 decimal place.

$\tan = \frac{\text{OPP}}{\text{Adj}}$

In $\triangle ABD$:

$\tan(20) = \frac{AB}{BD}$

$BD \tan(20) = AB$

$AB = 12.6 \tan(20)$

In $\triangle DBC$: $CD^2 = DB^2 + BC^2$ (rearrange to subject BC)

$BC^2 = CD^2 - DB^2$ (pythagoras theorem)

$BC^2 = (19.3)^2 - (12.6)^2$

$BC = \sqrt{(19.3)^2 - (12.6)^2}$

$AC = AB + BC$

$= 12.6 \tan(20) + \sqrt{(19.3)^2 - (12.6)^2}$ Put it in the calculator

$= 19.2055$

↳ $0 < 5$ ∴ round down

≈ 19.2

19.2 cm

(Total for Question 19 is 5 marks)

20

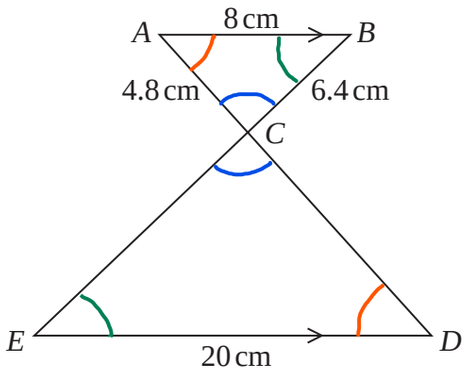


Diagram **NOT** accurately drawn

AB is parallel to *ED*.
ACD and *BCE* are straight lines.

AB = 8 cm
AC = 4.8 cm
BC = 6.4 cm
ED = 20 cm

Work out the length of *BE*.

$\triangle ECD$ and $\triangle ABC$ are similar.

$$\frac{AB}{ED} = \frac{AC}{CD} = \frac{BC}{CE}$$

$$\frac{8}{20} = \frac{6.4}{CE}$$

$\times CE$

$$CE \times \frac{8}{20} = 6.4$$

$\times \frac{20}{8}$

$$CE = \frac{6.4}{8} \times 20$$

$$= 16 \text{ cm}$$

$$BE = BC + CE$$
$$= 6.4 + 16$$
$$= 22.4 \text{ cm}$$

22.4 cm

(Total for Question 20 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

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