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: 1 hour 30 minutes) | Paper Reference **4MB0/01R**

Mathematics B

Paper 1R

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.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

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.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ▶

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P 5 5 9 4 6 A 0 1 2 4

Pearson

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Adam's weight is 190 pounds.

Given that 1 pound = 0.454 kilograms,
calculate Adam's weight in kilograms.

kg

(Total for Question 1 is 2 marks)

2

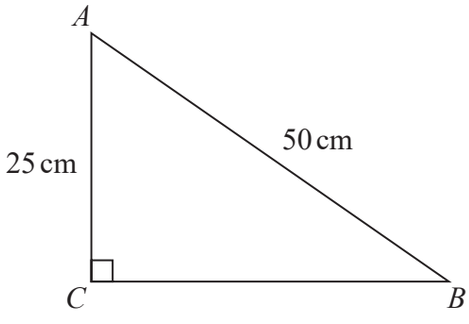


Diagram **NOT** accurately drawn

The diagram shows triangle ABC with $AB = 50$ cm, $AC = 25$ cm and angle $ACB = 90°$

Calculate the length, in cm to 3 significant figures, of BC.

cm

(Total for Question 2 is 2 marks)

3 Factorise completely $3a^5b^5 - 6a^3b^6 + 15a^2b^7$

(Total for Question 3 is 2 marks)

4 Express $\frac{31}{362}$

(a) as a decimal to 3 decimal places,

(1)

(b) as a decimal to 3 significant figures.

(1)

(Total for Question 4 is 2 marks)

5 Two sets, A and B, are such that

$$n(A) = 42 \quad n(A \cup B) = 60 \quad n(A \cap B) = 17$$

Find $n(B)$

(Total for Question 5 is 2 marks)

6 Find the Lowest Common Multiple (LCM) of 42, 60 and 66

(Total for Question 6 is 2 marks)

7 Tang received \$338 in pay **after** 35% had been deducted for tax.

Calculate Tang's pay, in \$, **before** the tax had been deducted.

\$

(Total for Question 7 is 2 marks)

8 Here are the first six terms of a sequence.

41 a 15 2 b –24

Find the value of a and the value of b.

$a =$

$b =$

(Total for Question 8 is 2 marks)

9

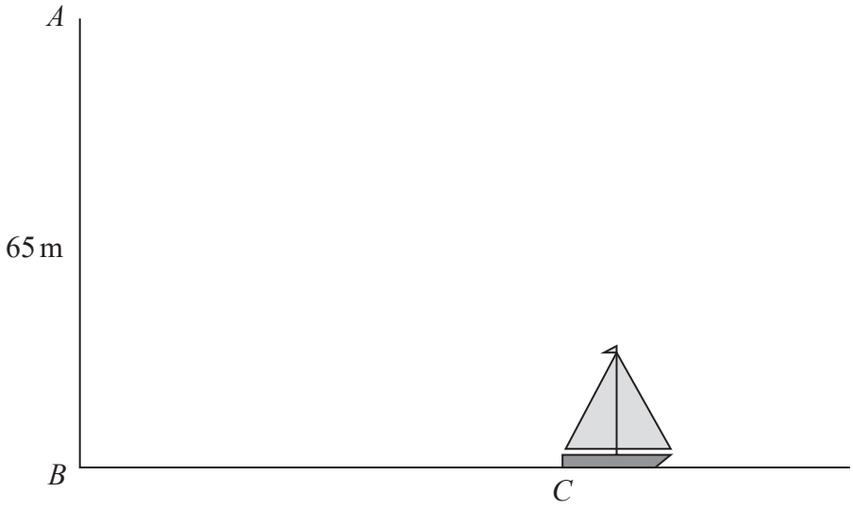


Diagram **NOT** accurately drawn

In the diagram, AB represents a vertical cliff of height 65 m.

The point C, on the boat, is on the surface of the sea such that the angle of depression of C from A, the top of the cliff, is 35°

Calculate the distance, in m to 3 significant figures, of C from B, the bottom of the cliff.

m

(Total for Question 9 is 2 marks)

10 A and B are two similar solids.

The surface area of the base of solid A is $324\,\text{cm}^2$

The surface area of the base of solid B is $441\,\text{cm}^2$

Given that the height of solid A is $9\,\text{cm}$, calculate the height of solid B.

cm

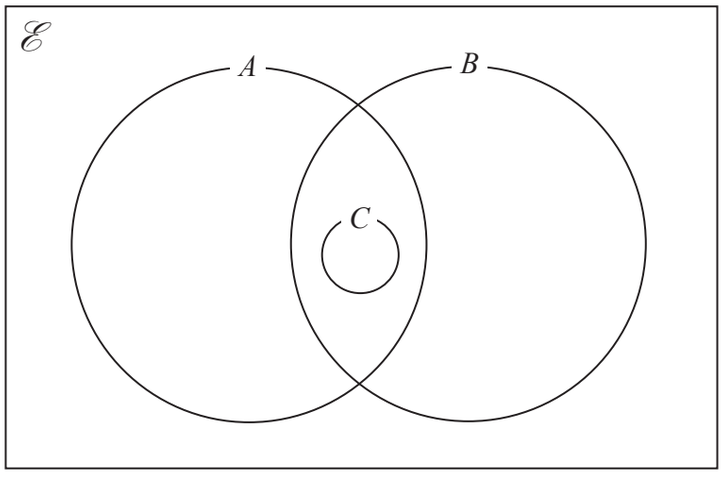
(Total for Question 10 is 3 marks)

11 Make a the subject of $d = \dfrac{bcd}{a} - \dfrac{b^2 - a}{ab}$

Show clear algebraic working and give your answer as a single fraction.

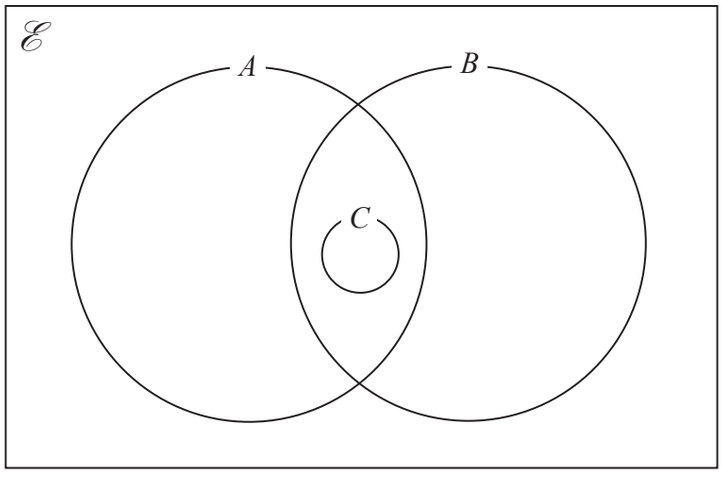
(Total for Question 11 is 3 marks)

12 (a) On the Venn diagram, shade the set $A \cap B$



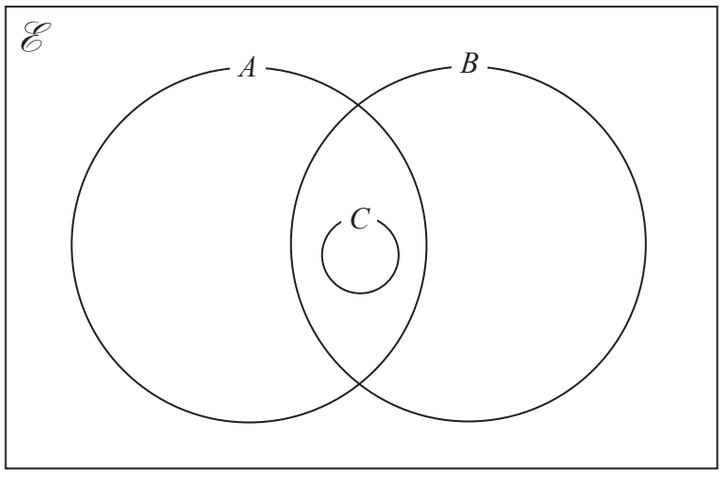
(1)

(b) On the Venn diagram, shade the set $B \cap C'$



(1)

(c) On the Venn diagram, shade the set $A \cap B \cap C'$



(1)

(Total for Question 12 is 3 marks)

13

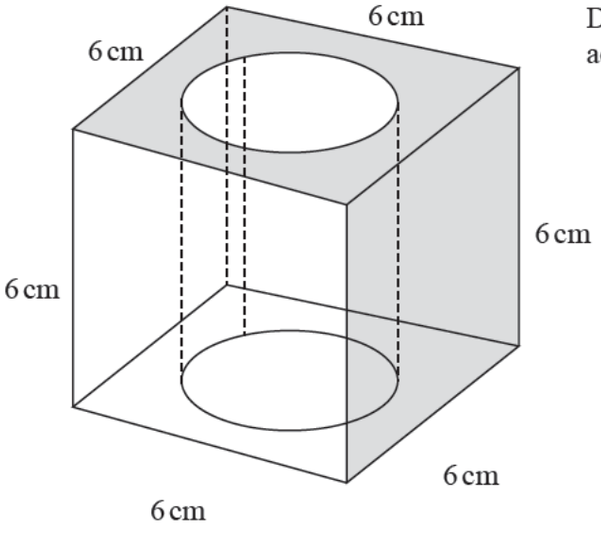


Diagram **NOT** accurately drawn

The diagram shows a shaded shape S formed by removing a right circular solid cylinder from a solid cube.

The cube has edges of length 6 cm.
The cylinder has diameter 4 cm and height 6 cm.

Express, in terms of π, the volume of S as a fraction of the volume of the cube.
Simplify your expression.

(Total for Question 13 is 3 marks)

14

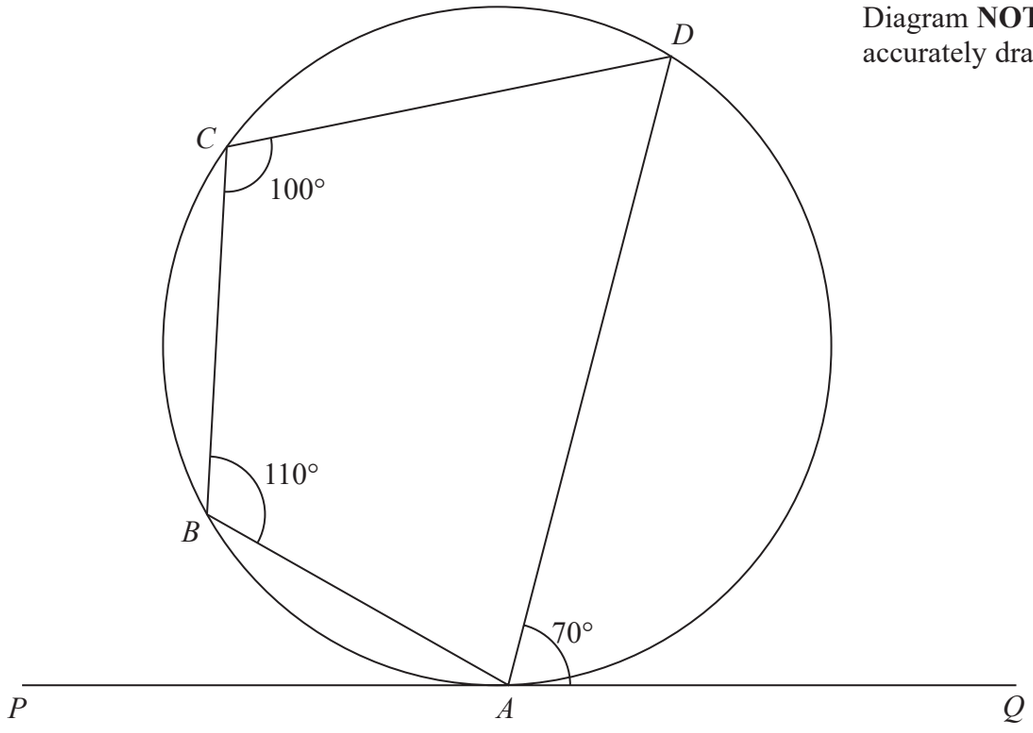


Diagram **NOT** accurately drawn

The diagram shows a circle $ABCD$ where the line PAQ is the tangent to the circle at A.

$\angle DAQ = 70°$ $\angle ABC = 110°$ $\angle BCD = 100°$

Giving your reasons, find, in degrees, the size of $\angle BAC$.

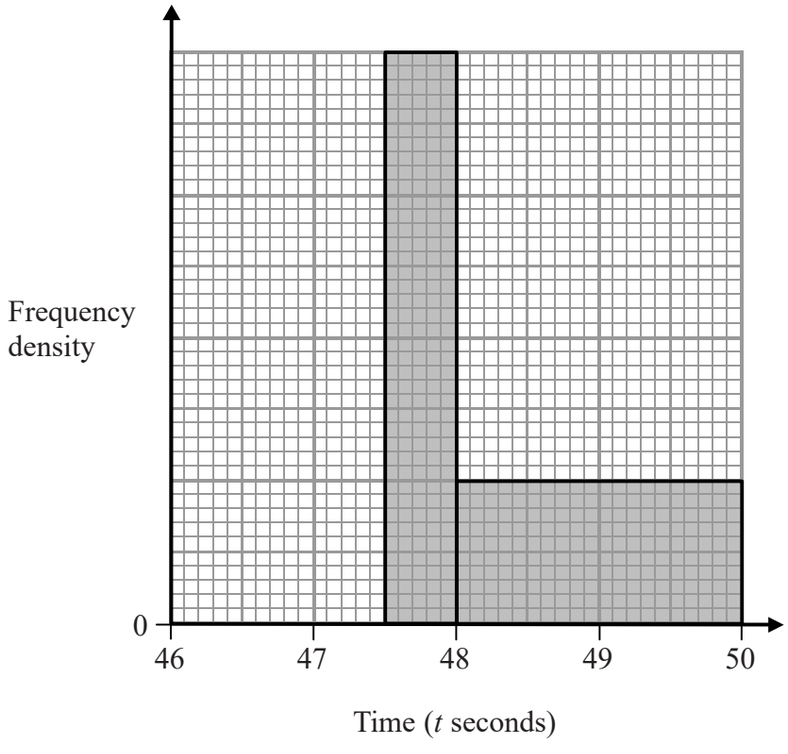
$\angle BAC =$ °

(Total for Question 14 is 4 marks)

15 The times taken, in seconds, by 65 athletes to run 400 metres were recorded. No athlete took less than 46.0 s and all athletes took less than 50.0 s.

The incomplete table and histogram give information about the times taken by these athletes.

Time (t seconds)	Number of athletes
$46.0 \leqslant t < 46.5$	10
$46.5 \leqslant t < 47.5$	
$47.5 \leqslant t < 48.0$	20
$48.0 \leqslant t < 50.0$	



Complete the table and the histogram.

(Total for Question 15 is 4 marks)

16

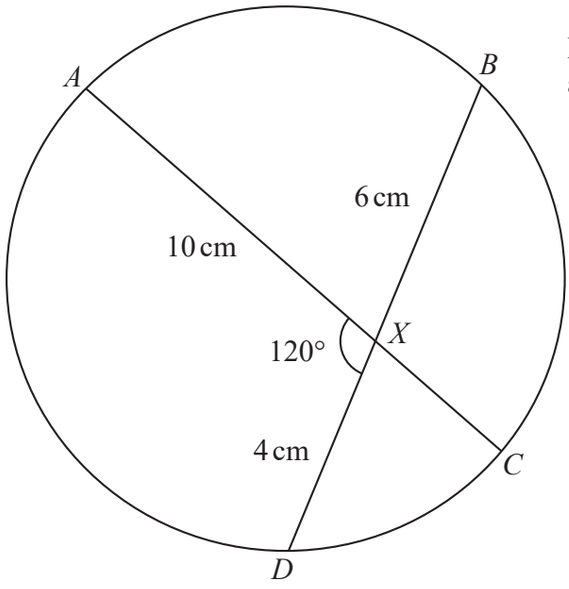


Diagram **NOT** accurately drawn

The diagram shows the circle $ABCD$.

The chords AC and BD intersect inside the circle at the point X such that

$AX = 10\,\text{cm}$ $BX = 6\,\text{cm}$ $XD = 4\,\text{cm}$ $\angle AXD = 120°$

Calculate

(a) the length, in cm, of XC,

$XC =$ cm

(2)

(b) the area, to the nearest cm^2, of triangle AXB.

cm^2

(2)

(Total for Question 16 is 4 marks)

17 Solve the simultaneous equations

$$2x + 9y = 8$$
$$3x + 2y = 1$$

Show clear algebraic working.

$x =$

$y =$

(Total for Question 17 is 4 marks)

18 The numbers of journeys made from a station on Monday, on Tuesday and on Wednesday one week were recorded.

The number on Monday to the number on Tuesday to the number on Wednesday = $5 : x : (2x - 5)$

The number of journeys on Tuesday was 544 and the number of journeys on Wednesday was 408

(a) Find the value of x.

$x =$

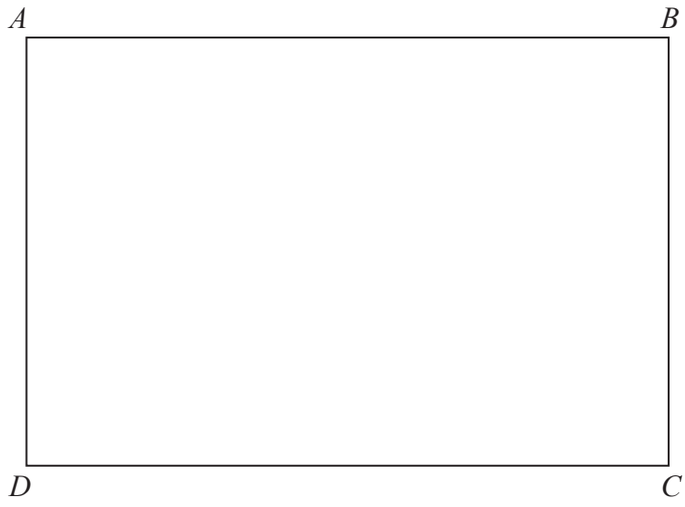
(2)

(b) Hence find the total number of journeys that were made from the station on Monday, Tuesday and Wednesday that week.

(2)

(Total for Question 18 is 4 marks)

19



The diagram shows the rectangle $ABCD$.

(a) Construct the locus of all points inside the rectangle that are 5 cm from C.

(1)

(b) **Showing all your construction lines**, construct the locus of all points inside the rectangle that are equidistant from AB and DC.

(2)

The region R consists of all the points inside the rectangle that are closer to AB than to DC and more than 5 cm from C.

(c) Show, by shading, the region R.
Label the region R.

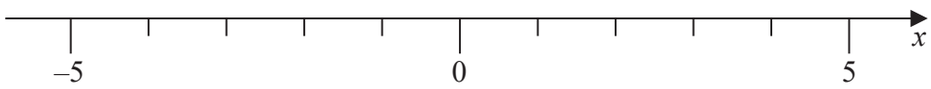
(1)

(Total for Question 19 is 4 marks)

20 (a) Find the set of values of x for which $-13 \leqslant 5x - 3 < 12$

(4)

(b) Represent on the number line below, the set of values of x for which $-13 \leqslant 5x - 3 < 12$



(1)

(Total for Question 20 is 5 marks)

21 Here are the weights, in kilograms, of 12 children.

19 25 28 21 22 21 26 28 24 20 29 28

Calculate

(a) the median weight,

kg

(2)

(b) the mean weight.

kg

(2)

One of these 12 children is chosen at random.

(c) Find the probability that this child has a weight that is less than 28 kg.

(1)

(Total for Question 21 is 5 marks)

22 Given that $\dfrac{75^{3n} \times 3^{2(n^2-5n)} \times 5^{2(1-3n)}}{45^2} = 3^y$

show that $y = 2n^2 - 7n - 4$

Show clear algebraic working.

(Total for Question 22 is 5 marks)

23 The surface area of a sphere of radius x cm is equal to the area of a square of side $(1 - x)$ cm.

(a) Show that x satisfies $x^2(4\pi - 1) + 2x - 1 = 0$

(2)

(b) Hence, or otherwise, find an expression for x in terms of π.

You must explain why you have chosen the expression and simplify the expression.

(3)

(Total for Question 23 is 5 marks)

24 $\mathbf{A} = \begin{pmatrix} 1 & 1 \\ 3 & x \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 1 & 2x \\ 1 & 2y \end{pmatrix}$

Given that $3\mathbf{A} - 2\mathbf{B} = \begin{pmatrix} 1 & -5 \\ 7 & 26 \end{pmatrix}$

find the value of x and the value of y.

$x =$

$y =$

(Total for Question 24 is 6 marks)

25 (a) Simplify fully $\dfrac{20x^4 + 26x^3 - 6x^2}{5x^2 - x}$

(4)

$$y = \frac{20x^4 + 26x^3 - 6x^2}{5x^2 - x} \qquad x \neq 0 \quad x \neq \frac{1}{5}$$

(b) Use your answer to part (a) to find $\dfrac{dy}{dx}$

$\dfrac{dy}{dx} =$

(2)

(Total for Question 25 is 6 marks)

26 A particle P is moving along a straight line. At time t seconds, the displacement, x metres, of P from a fixed point O on the line is given by

$$x = 4 + 7t - 2t^2 \qquad t \geqslant 0$$

At time t seconds, the velocity of P is v m/s.

(a) Find an expression for v in terms of t.

(1)

In the interval $0 \leqslant t \leqslant 4$, P is furthest away from O when P is at the point A on the line.

(b) Find the value of t when P is at the point A.

(2)

(c) Find the distance, in metres, of A from O.

metres

(1)

(d) Find the total distance, in metres, travelled by P in the interval $0 \leqslant t \leqslant 4$

metres

(3)

(Total for Question 26 is 7 marks)

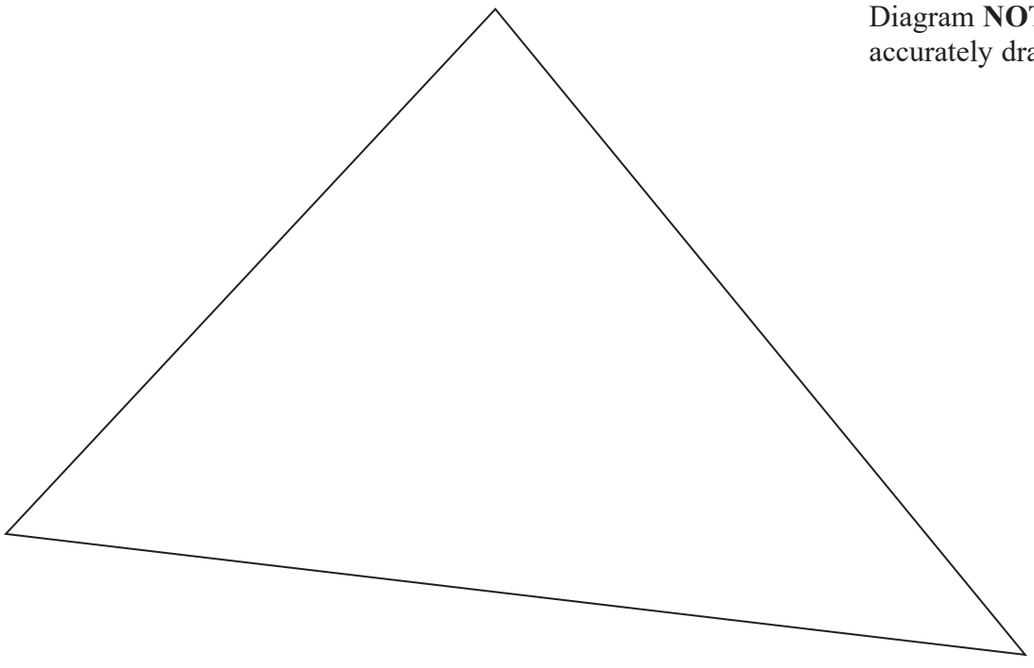
27 The point A is a distance of 12 km on a bearing of 060° from port P.

A ship starts at A and sails on a bearing of 150°. The ship sails for 48 minutes at a constant speed of 20 km/h to point B.

(a) Draw a labelled diagram to show the information about the positions of P, A and B.

The diagram has been started for you below and you should show on the diagram the distances of P and B from A and the given bearings.

Diagram **NOT** accurately drawn



(3)

(b) Calculate the bearing, to the nearest degree, of P from B.

°

(4)

(Total for Question 27 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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