NON-CALC F

GCSE Mathematics · Higher Tier

40 marks · 45 minutes · Non-calculator

Name ..... **Class** .....

Answer all questions. Show all your working. Diagrams are NOT accurately drawn unless stated.

1 **(a)** Write 84 as a product of its prime factors.

.....

(2)

(b) A bell rings every 84 seconds. A second bell rings every 60 seconds.
Both bells ring together at 10:00 am.
At what time will the bells next ring together?

.....

(2)

(Total for Question 1 is 4 marks)

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2 Priya has £360

She spends $\frac{3}{8}$ of the £360 on a coat.

She then spends $\frac{2}{5}$ of the money she has left on shoes.

Priya says,

"I have more than £130 left."

Is Priya correct? You must show how you get your answer.

(Total for Question 2 is 3 marks)

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3 Ella wants to estimate the number of fish in a pond.

She catches 40 fish from the pond, puts a mark on each fish and returns them to the pond.

A week later she catches 50 fish from the pond. 8 of these fish are marked.

(a) Work out an estimate for the number of fish in the pond.

.....

(2)

(b) Write down one assumption you have made.

.....

(1)

(Total for Question 3 is 3 marks)

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4 A biased spinner can land on red, blue, green or yellow.

The table shows some of the probabilities.

Colour	red	blue	green	yellow
Probability	0.25	0.3		

The probability that the spinner lands on yellow is twice the probability that it lands on green.

(a) Work out the probability that the spinner lands on green.

.....

(2)

(b) The spinner is spun 200 times.

Work out an estimate for the number of times it lands on yellow.

.....

(1)

(Total for Question 4 is 3 marks)

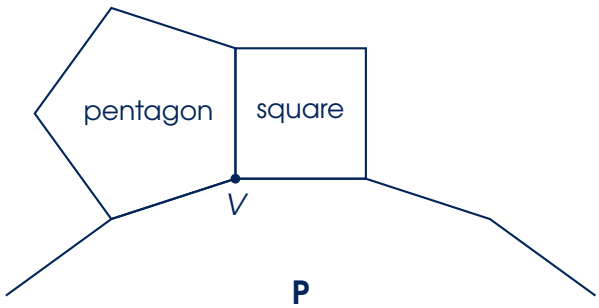
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5 Show that $(x+5)^2-(x-3)^2=16(x+1)$ for all values of x.

(Total for Question 5 is 3 marks)

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6 The diagram shows a regular pentagon, a square and part of a regular polygon **P**.
The three shapes meet at the point V with no gaps between them.



Work out the number of sides of polygon **P**.

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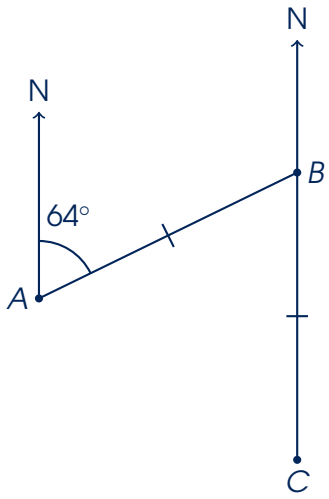
(Total for Question 6 is 3 marks)

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7 The diagram shows the positions of three towns, A, B and C.

The bearing of B from A is 064°.

C is due south of B. $AB = BC$



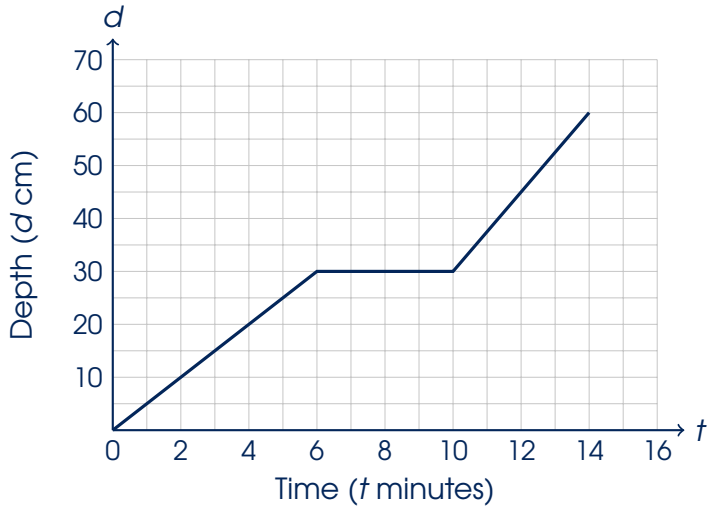
Work out the bearing of C from A.

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(Total for Question 7 is 3 marks)

8 Water is poured into a tank.

The graph shows the depth, d cm, of the water in the tank t minutes after the start.



(a) Work out the rate at which the depth of the water increased in the first 6 minutes.

Give the units of your answer.

.....

(2)

(b) Describe what happened between $t = 6$ and $t = 10$

.....

(1)

(c) Ravi says,

"The depth increased faster in the last 4 minutes than in the first 6 minutes."

Is Ravi correct? Give a reason for your answer.

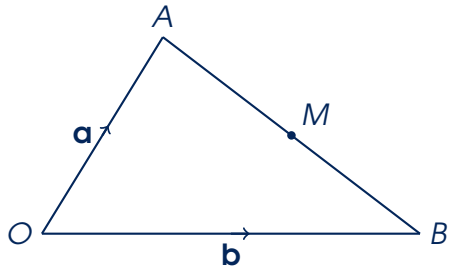
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(1)

(Total for Question 8 is 4 marks)

9 OAB is a triangle. $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$

M is the midpoint of AB.



Find $\overrightarrow{OM}$ in terms of **a** and **b**. Give your answer in its simplest form.

.....

(Total for Question 9 is 2 marks)

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10 **(a)** Write $x^2 + 6x - 11$ in the form $(x + p)^2 + q$, where p and q are integers.

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(2)

(b) Hence solve $x^2 + 6x - 11 = 0$

Give your solutions in the form $a \pm b\sqrt{5}$, where a and b are integers.

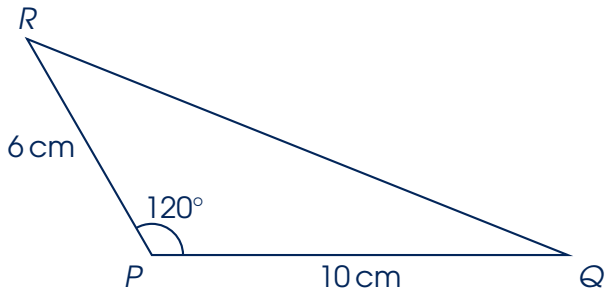
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(2)

(Total for Question 10 is 4 marks)

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11 PQR is a triangle. $PQ = 10\,\text{cm}$, $PR = 6\,\text{cm}$ and angle $QPR = 120°$



Work out the exact area of triangle PQR.

Give your answer in the form $k\sqrt{3}$

.....

(Total for Question 11 is 2 marks)

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12 y is directly proportional to $\sqrt{x}$

When $x = 9$, $y = 12$

(a) Work out the value of y when $x = 25$

.....

(3)

(b) Sam says,

"When x is multiplied by 4, the value of y is also multiplied by 4"

Is Sam correct? Give a reason for your answer.

.....

(1)

(Total for Question 12 is 4 marks)

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13 Prove algebraically that the recurring decimal $0.3\dot{1}\dot{8} = \frac{7}{22}$

(Total for Question 13 is 2 marks)

TOTAL FOR PAPER IS 40 MARKS