MINISTRY OF EDUCATION AND HUMAN RESOURCES
MAURITIUS EXAMINATIONS SYNDICATE

NATIONAL ASSESSMENT AT FORM III

NAME	
SCHOOL NAME	
CLASS/SECTION	

MATHEMATICS

OCTOBER 2013

1 hour 45 minutes

Students answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, the name of your school and your class/section in the spaces provided above.

Write in dark blue or black ink.

You may use a soft pencil for any diagram or rough working.

Do not use correction fluid.

There are **18** questions in this paper.

Answer **all** questions.

If working is needed for any question it must be shown in the space below that question.

Omission of essential working may result in loss of marks.

Diagrams are **not** drawn to scale, unless specified otherwise in a particular question or part question.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is **100**.

1. Evaluate

(a) $\sqrt{36}$,

Answer ……..... [1]

(b) $12 + 8 \div 4$,

Answer …..…… [1]

(c) $9.45 - 3.82$.

Answer …..…… [1]

2. **(a)** Write down the next term in the sequence

$6,\ 12,\ 24,\ 48,$ ....

Answer ……... [1]

(b) Convert 7.5 metres into centimetres.

Answer ……..…… cm [1]

(c) Write down 6.387 correct to two decimal places.

Answer ……...[1]

3. **(a)** A cake costs Rs 12. What is the cost of 20 such cakes?

Answer Rs ..... [1]

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

Answer ..... [1]

(c) Find the value of $2\frac{2}{5} \times \frac{10}{27}$, giving your answer as a fraction in its lowest terms.

Answer ..... [1]

4. Simplify

(a) $a^4 \times a^7$,

Answer ……..……..…. [1]

(b) $x^{10} \div x^6$,

Answer ……..…..... [1]

(c) $(y^3)^4$.

Answer ……..…. [1]

5. Given that $\mathbf{A} = \begin{pmatrix} 5 & 3 \\ 2 & 4 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 2 & 1 \\ 7 & 6 \end{pmatrix}$, find

(a) $2\mathbf{A} + 3\mathbf{B}$,

Answer ……..…….…… [2]

(b) **AB**.

Answer ……..…….…… [2]

6. **(a)** Given that $a = -9$ and $b = -5$, find the value of $3a - 4b$.

Answer ..... [2]

(b) Expand and simplify $(3x - 5)^2$.

Answer ..... [2]

(c) Factorise

(i) $y^2 + 5y$,

Answer ..... [1]

(ii) $m^2 - 9$.

Answer ..... [1]

7. **(a)** In a box there are 4 red balls, 6 blue balls and 7 yellow balls. A ball is drawn at random from the box.

Giving your answer as a fraction, find the probability that the ball is

(i) red,

Answer ……..……. [1]

(ii) not blue.

Answer ……..…….. [1]

(b) Given $\xi = \{a, b, c, d, e, f, g, h\}$, $P = \{c, d, e, h\}$ and $Q = \{a, c, e, g, h\}$,

(i) list the elements of $P \cap Q$,

Answer ..……..……[1]

(ii) find n(Q') .

Answer ..……..……[1]

8. Solve the simultaneous equations

$2x + 5y = 31$,

$3x + 4y = 36$.

Answer x = ……..

y = …….. [4]

9. A cubical die was thrown 50 times. The table shows the number of times that each score occurred.

Score	1	2	3	4	5	6
Frequency	5	7	6	7	15	10

For the above distribution, find the

(a) mode,

Answer ……..…….... [1]

(b) mean,

Answer ……..…….... [3]

(c) median.

Answer ……..…….... [3]

10. **(a)** Solve the equation $\frac{3x-2}{6} = \frac{4x+1}{5}$.

Answer x = ... [3]

(b) Solve the inequality $5 - 3x > 23$.

Answer ..... [3]

(c) Given that $p = 7x + 4q$, express x in terms of p and q.

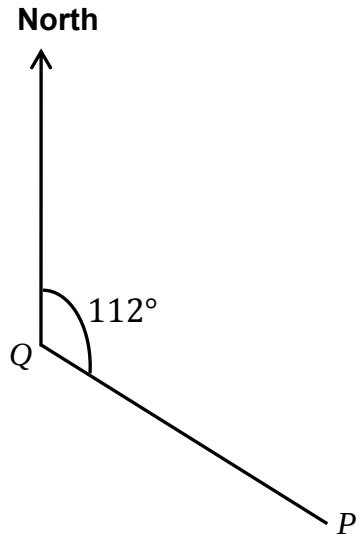
Answer ..... [2]

11. (a) Find the equation of the straight line passing through the points $A\ (2, 5)$ and $B\ (4, 11)$.

Answer ..... [3]

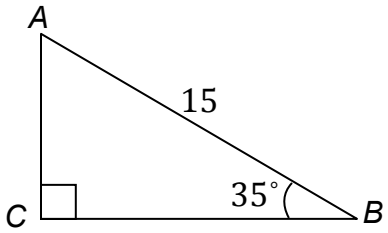
(b) The bearing of P from Q is $112°$.

Calculate the bearing of Q from P .



Answer ..... [2]

12. (a) In the triangle ABC, $\hat{ABC} = 35°$, $\hat{ACB} = 90°$ and $AB = 15$ cm.



$[\sin 35° = 0.574,\ \cos 35° = 0.819,\ \tan 35° = 0.700]$

Using as much of the information as necessary, calculate the length of AC.

Answer …….. cm [3]

(b) Given that vector $\overrightarrow{PQ} = \begin{pmatrix} 8 \\ -6 \end{pmatrix}$, find

(i) $\overrightarrow{QP}$,

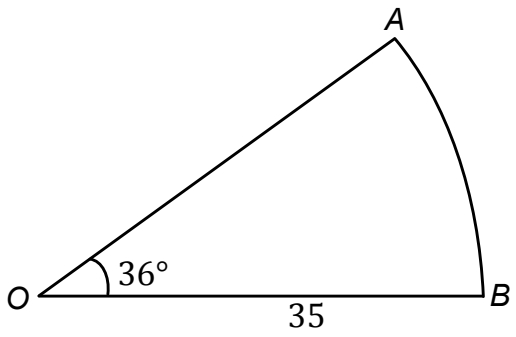
Answer ……..…… [1]

(ii) $\left|\overrightarrow{PQ}\right|$.

Answer …..…… [2]

13. **(a)** The diagram shows sector *OAB* of a circle with centre *O* and radius 35 cm.

Given that $A\hat{O}B = 36°$, calculate



(i) the length of arc *AB*. [$\boldsymbol{\pi = \frac{22}{7}}$]

Answer .....cm [2]

(ii) the area of sector *OAB*. [$\boldsymbol{\pi = \frac{22}{7}}$]

Answer .....cm^2 [2]

(b) Each of the exterior angles of a **regular** polygon is $30°$.

Calculate the number of sides in the polygon.

Answer ..... [2]

14. **(a)** Find the highest common factor (**H.C.F.**) of 16 and 24.

Answer ……... [1]

(b) Three bells ring at intervals of 15, 30 and 45 minutes respectively.
They ring together at $08\ 40$.

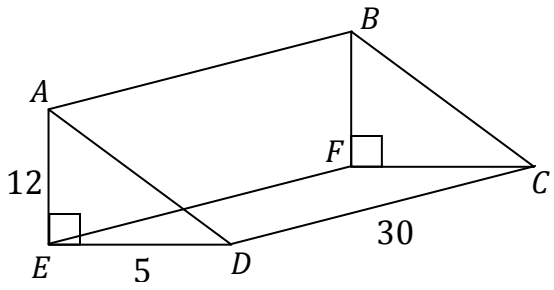
At what time will they next ring together?

Answer ……..…… [4]

(c) A gardener plants 30 trees in a straight line. The trees are 10 m apart.
What is the distance between the first tree and the last tree?

Answer …….. m [2]

15. The diagram shows a **solid** prism $ABCDEF$ with $AE = BF = 12$ cm, $ED = FC = 5$ cm, $DC = EF = AB = 30$ cm and $A\hat{E}D = B\hat{F}C = 90^{\circ}$.



(a) Using Pythagoras' theorem, calculate the length of AD.

Answer ..... cm [2]

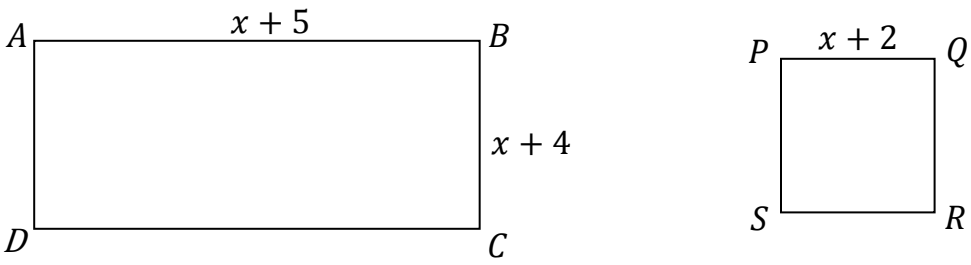
(b) Find the area of the triangle ADE.

Answer ..... cm^2 [2]

(c) Calculate the total surface area of the solid prism.

Answer ..... cm^2 [3]

16. $ABCD$ is a rectangle with $AB = (x + 5)$ cm and $BC = (x + 4)$ cm.
$PQRS$ is a square with $PQ = (x + 2)$ cm.



The area of the rectangle $ABCD$ is **twice** the area of the square $PQRS$.

(a) Form an equation in x and show that it simplifies to $x^2 - x - 12 = 0$. [5]

(b) Solve the equation $x^2 - x - 12 = 0$.

Answer x = …… or ……..…. [3]

(c) Hence, find the length of AB.

Answer ……..……..…. cm [1]

17. The number of listeners of a radio station in 2010 was $150\,000$.

(a) In 2011, the number of listeners increased to $180\,000$.
Calculate the percentage increase.

Answer ……..…… % [2]

Each year, the radio station invites its listeners to vote for their favourite programme.

(b) In 2010, 60% of the listeners voted.

Calculate the number of listeners who voted in 2010.

Answer …… [2]

(c) In 2012, the number of listeners was $250\ 000$ and $200\ 000$ of them voted.

(i) Calculate the percentage of listeners who voted in 2012.

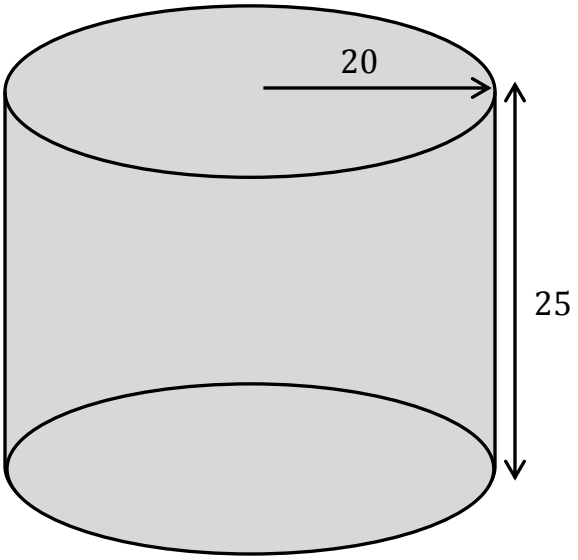
Answer ……% [2]

(ii) The number of listeners who voted in 2012 was 25% more than the number of listeners who voted in 2011.

Calculate the number of listeners who voted in 2011.

Answer …… [3]

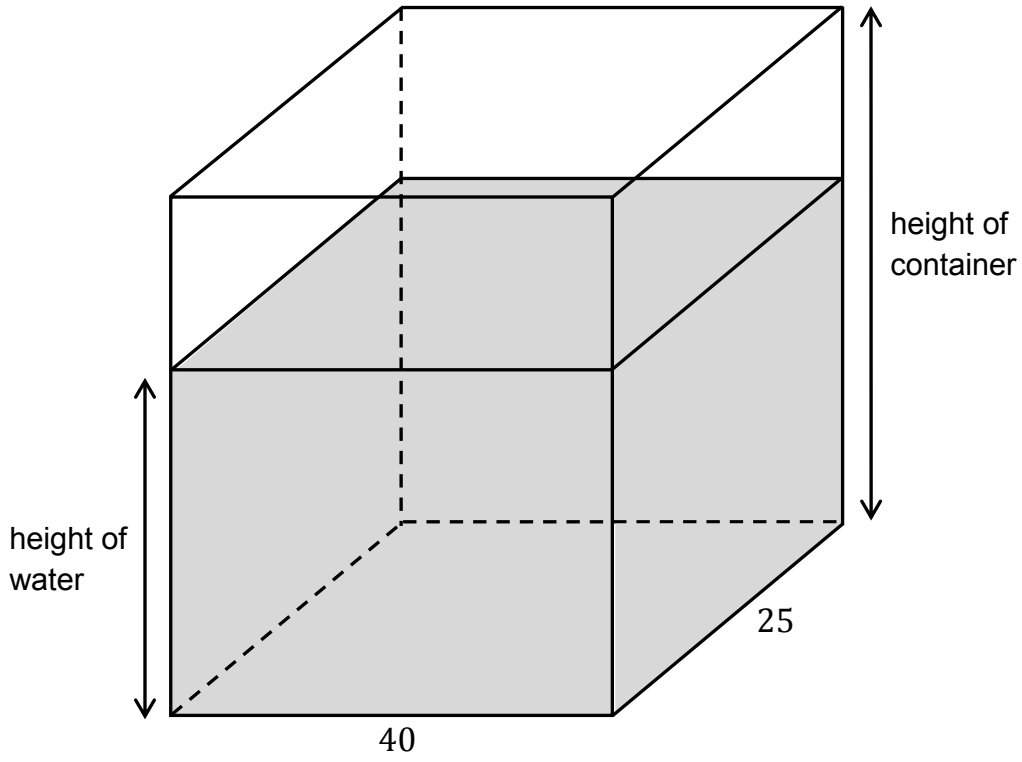
18. A cylindrical container **A** has radius 20 cm and height 25 cm.
It is completely filled with water as shown below.



Container **A**

A rectangular container **B** has length 40 cm and width 25 cm. Initially the container **B** was empty.

All the water from container **A** is poured into container **B** (see diagram below).



Container **B**

The ratio of the height of water to the height of container **B** is $2 : 3$.

Find the height of container **B**.

[Use $\pi = 3.14$ in this question]

Answer ..... cm [6]

End of Question Paper