

National 5 Practice Paper G

Paper 1

Duration - 1 hour

Total marks - 40

- You may NOT use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

FORMULAE LIST

The roots of are $ax^2 + bx + c = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

Area of a triangle: $A = \frac{1}{2}ab \sin C$

Volume of a Sphere: $V = \frac{4}{3}\pi r^3$

Volume of a cone: $V = \frac{1}{3}\pi r^2 h$

Volume of a pyramid: $V = \frac{1}{3}Ah$

Standard deviation: $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2/n}{n-1}}$, where n is the sample size.

1. Evaluate $\frac{2}{5} \div 1\frac{1}{10}$.

2

2. Factorise fully $2m^2 - 18$.

2

3. Given that $f(x) = 5 - x^2$, evaluate $f(-3)$.

2

4. Solve the equation $3x+1=\frac{x-5}{2}$.

3

5. Express $\sqrt{63}+\sqrt{28}-\sqrt{7}$ as a surd in its simplest form.

3

6. Express $x^2 + 10x + 17$ in the form $(x + p)^2 + q$. 2

7. Alan is taking part in a quiz. He is awarded x points for each correct answer and y points for each wrong answer. During the quiz, Alan gets 24 questions correct and 6 wrong. He scores 60 points.

- (a) Write down an equation in x and y which satisfies the above condition. 1

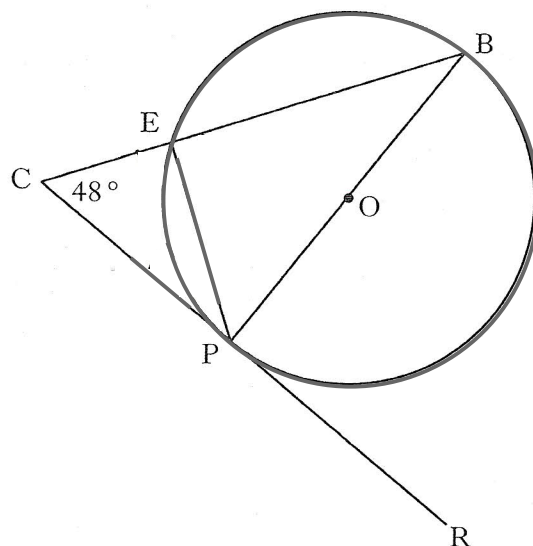
Helen also takes part in the quiz. She gets 20 questions correct and 10 wrong. She scores 40 points.

- (b) Write down a second equation in x and y which satisfies this condition. 1

- (c) Calculate the score for David who gets 17 correct and 13 wrong. 4

Total marks 6

8. A circle, centre O, is shown below.



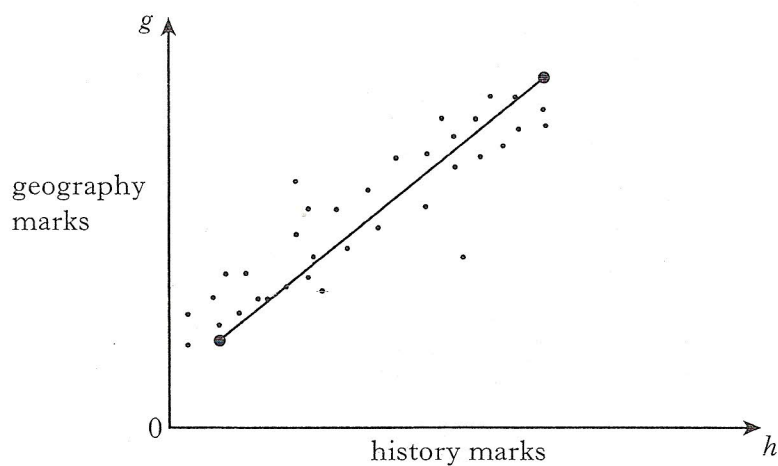
In the circle

- PB is a diameter
- CR is a tangent to the circle at point P
- Angle BCP is 48° .

Calculate the size of EPR.

3

9. The graph below shows the relationship between the History and Geography marks of a class of students.



A best-fitting straight line, AB has been drawn.

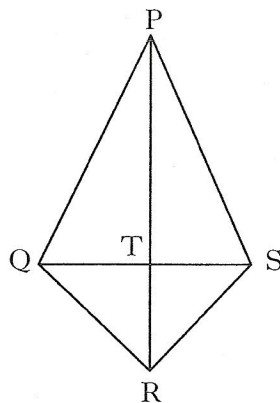
Point A represents 12 marks for history and 20 marks for geography.

Point B represents 92 marks for history and 80 marks for geography.

Find the equation of the straight line AB in terms of h and g .

4

10. A kite PQRS is shown below.



The diagonals of the kite intersect at T.

$$PT = 2TR.$$

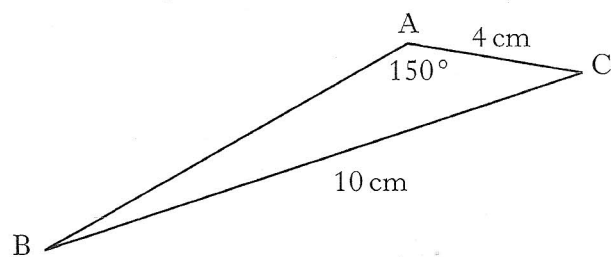
\overrightarrow{PR} represents vector **a**.

\overrightarrow{QS} represents vector **b**.

Express \overrightarrow{PS} in terms of **a** and **b**.

2

11. In the triangle ABC



- AC = 4 centimetres
- BC = 10 centimetres
- Angle BAC = 150°

Given that $\sin 30^\circ = \frac{1}{2}$, show that $\sin B = \frac{1}{5}$.

4

12. Express $\frac{b^{\frac{1}{2}} \times b^{\frac{5}{2}}}{b^2}$ in its simplest form.

2

13. Express $\frac{5p^2}{8} \div \frac{p}{2}$ as a fraction in its simplest form.

3

14. Prove that $\frac{\sin^2 A}{1 - \sin^2 A} = \tan^2 A$.

2

[END OF PRACTICE QUESTION PAPER]

National 5 Practice Paper G

Paper 2

Duration - 1 hour and 30 minutes

Total marks - 50

- You may use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

FORMULAE LIST

The roots of are $ax^2 + bx + c = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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Standard deviation: $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2/n}{n-1}}$, where n is the sample size.

1. $E = mc^2$

Find the value of E when $m = 3.6 \times 10^{-2}$ and $c = 3 \times 10^8$.

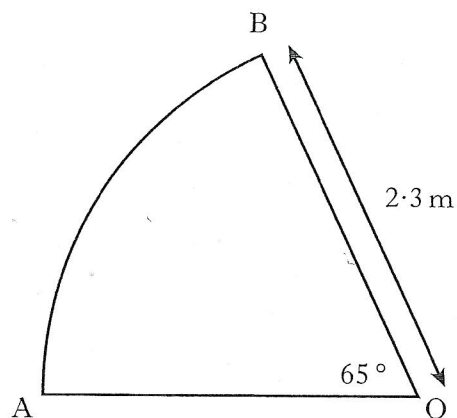
Give your answer in scientific notation.

3

2. Expand fully and simplify $x(x-1)^2$.

2

3. A sector of a circle, centre O, is shown below.



The radius of the circle is 2.3 metres.

Angle AOB is 65° .

Find the length of the arc AB.

3

4. Change the subject of the formula $p = q + 2r^2$ to r .

3

5. Solve the equation $2x^2 + 3x - 7 = 0$.

Give your answer **correct to 2 significant figures**.

4

6. The marks of a group of students in their October test are listed below.

41 56 68 59 43 37 70 58 61 47 75 66

- (a) Calculate the median and the interquartile range.

3

The teacher arranges extra homework classes for the students before the next test in December.

In this test, the median is 67 and the interquartile range is 14.

- (b) Make **two** appropriate comments comparing the marks in the October and December tests.

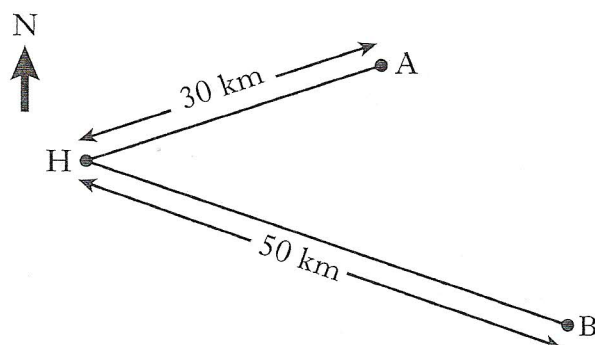
2

Total marks 5

7. Two yachts leave from harbour H.

Yacht A sails on a bearing of 072° for 30 kilometres and stops.

Yacht B sails on a bearing of 140° for 50 kilometres and stops.



How far apart are the two yachts when they have both stopped?

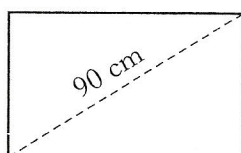
Do not use a scale drawing.

4

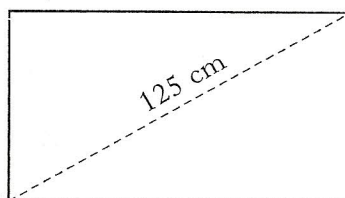
8. Two rectangular solar panels, A and B, are mathematically similar.

Panel A has a diagonal of 90 centimetres and an area of 4020 square centimetres.

A



B



A salesman claims that panel B, with a diagonal of 125 centimetres, will be double the area of panel A.

Is this claim justified?

Show all your working.

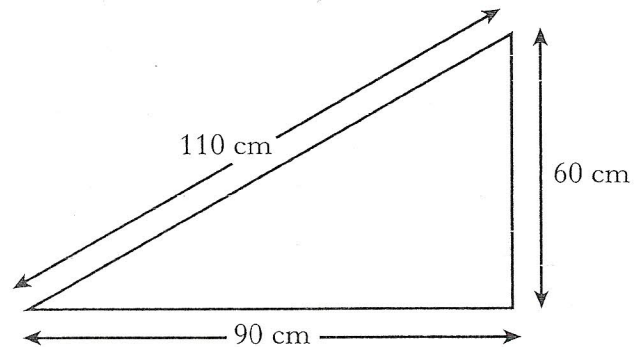
4

9. Vector \mathbf{u} has components $\begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}$ and vector \mathbf{v} has components $\begin{pmatrix} 1 \\ 2 \\ -4 \end{pmatrix}$.

Calculate the magnitude of $2\mathbf{u} - \mathbf{v}$.

2

10. A triangular paving slab has measurements as shown.

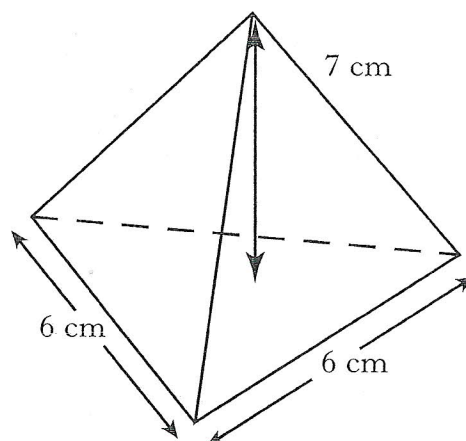


Is the slab in the shape of a right angled triangle?

Show your working.

3

11. The diagram below shows a pyramid.



The base of the pyramid is an equilateral triangle of side 6 centimetres.

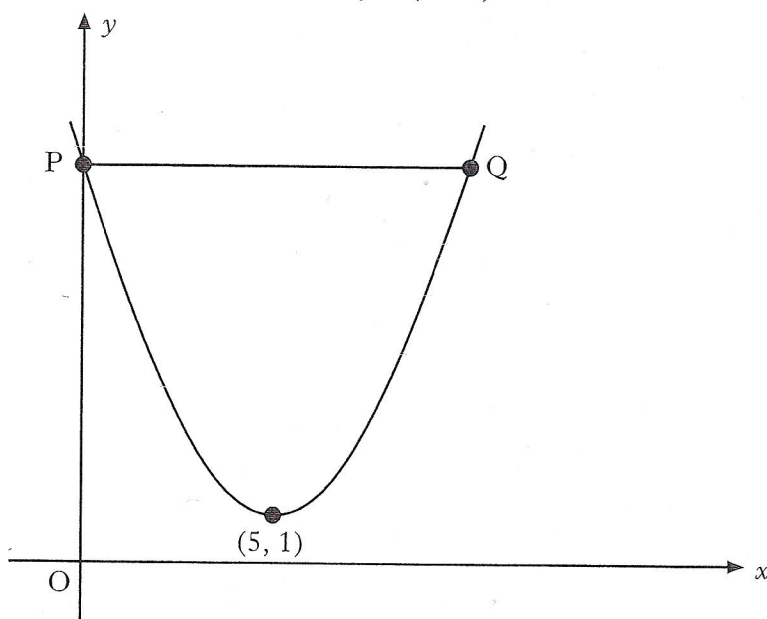
The height of the pyramid is 7 centimetres.

Calculate the volume of the pyramid.

3

12. The graph below shows part of a parabola with equation of the form

$$y = (x + a)^2 + b.$$



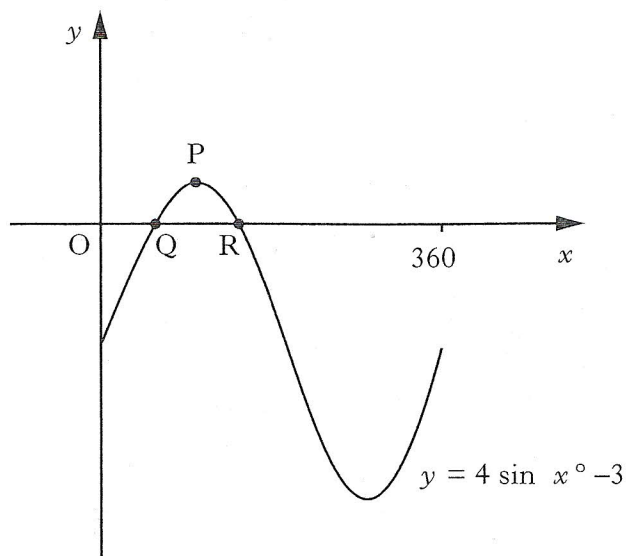
- (a) State the values of a and b .
- (b) The line PQ is parallel to the x - axis.
Find the coordinates of points P and Q.

2

3

Total marks 5

13. Part of the graph of $y = 4 \sin x^\circ - 3$ is shown below.



The graph cuts the x - axis at Q and R.

P is the maximum turning point.

- (a) Write down the coordinates of P.

1

- (b) Calculate the x - coordinates of Q and R.

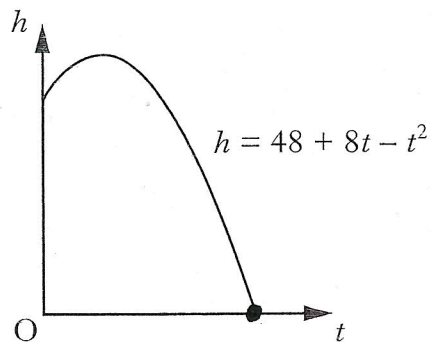
4

Total marks 5

14. The diagram shows the path of a flare after it is fired.

The height, h metres above sea level, of the flare is given by

$h = 48 + 8t - t^2$ where t is the number of seconds after firing.



Calculate, **algebraically**, the time taken for the flare to enter the sea.

4

[END OF PRACTICE QUESTION PAPER]