



Mathematics

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

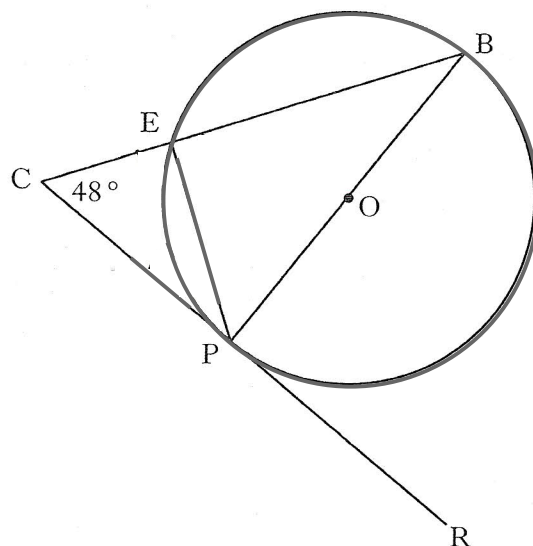
Helen also takes part in the quiz. She gets 20 questions correct and 10 wrong. She scores 40 points.

- (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.



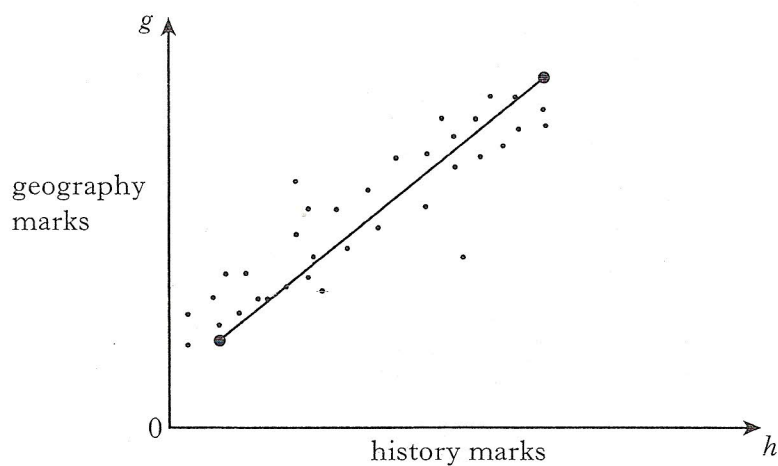
In the circle

- 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.

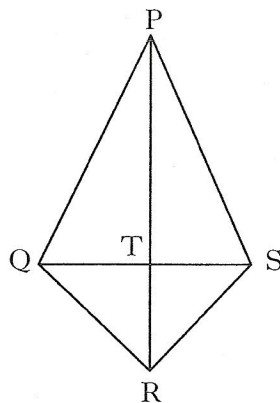
Point A represents 12 marks for history and 20 marks for geography.

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.

$$PT = 2TR.$$

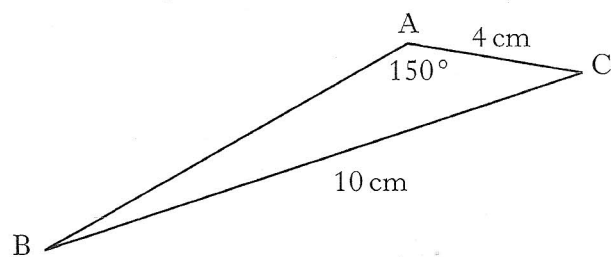
\overrightarrow{PR} represents vector **a**.

\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]