



Practice Paper E

Paper 1 – Non-Calculator

Total Marks – 50

Attempt ALL questions.

You not may use a calculator.

Full credit will only be given to solutions which contain appropriate working.

State the units for your answers where appropriate

Write your answers clearly in the space provided in this booklet.

FORMULAE LIST

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

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 $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$

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

1. Expand and simplify

3

$$3(2x - 1) - 2(x + 3)(x - 4)$$

2. Write

2

$$\frac{8}{3\sqrt{6}}$$

with a rational denominator in its simplest form

3. Evaluate

2

$$2\frac{4}{7} \div 1\frac{4}{9}$$

4. a. Evaluate

3

$$32^{\frac{2}{5}}$$

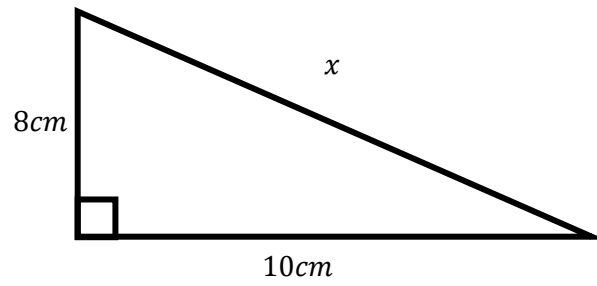
b. Simplify

2

$$\frac{(2x^5y^2)^2}{10x^2y^5}$$

5. Find the value of x .

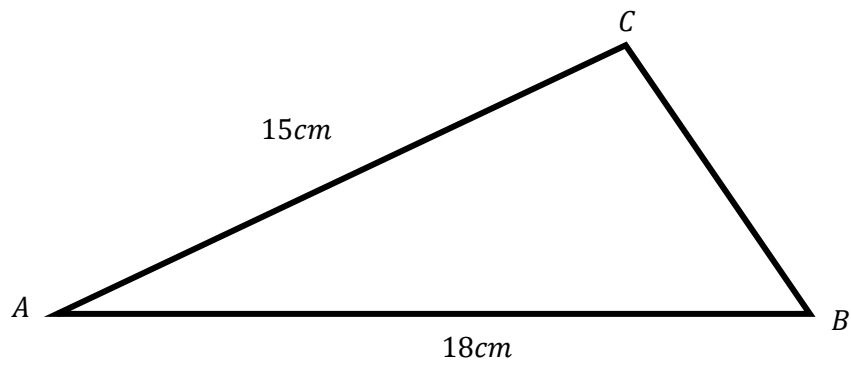
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Give your answer as a surd in its simplest form.

6. Given that $\sin A = 0.2$, find the area of triangle ABC

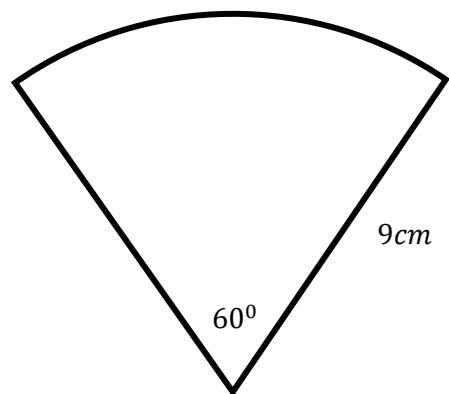
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7. Calculate the perimeter of the sector below.

4

Take $\pi = 3.14$.



8. State the nature of the roots of

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$$y = 2x^2 + 5x + 7$$

9. Write the following in ascending order:

1

$$\cos 90, \sin 50, \tan 100, \cos 0$$

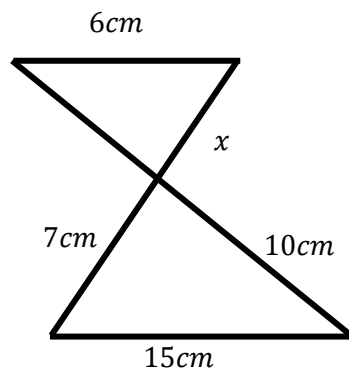
10. Find, algebraically, the point of intersection between the lines

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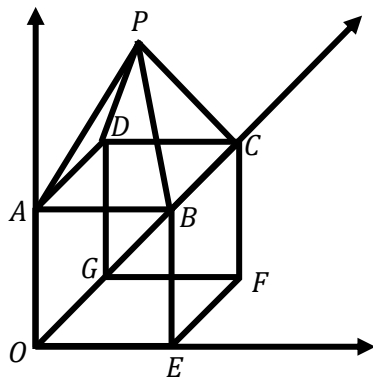
$$2x + 3y = 1 \text{ and } 3x - 2y = 8.$$

11. Find the value of x :

3



12. The pyramid $ABCDP$ is placed on top of rectangle $ABCDEFGO$.



- The coordinate of E is $(6, 0, 0)$
- The coordinate of F is $(6, 8, 0)$
- The height of the cuboid is 10 units.
- The height of the pyramid is 8 units.

a. State the coordinate of D 1

b. State the coordinates of C . 1

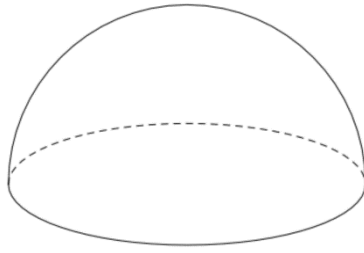
13. Smith's Sports Clothing profits 30% drop in profits from the second to the third quarter of the financial year. 3

Smith's Sports Clothing made profits of £42,000 in the third quarter.

Calculate Smith's Sports Clotting profits for the second quarter.

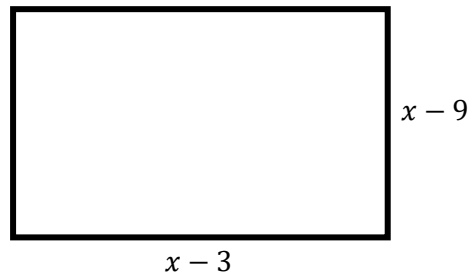
14. Find the volume of a hemisphere with a diameter of 12cm .

3



Take $\pi = 3.14$.

15. A rectangle has a length given by $x - 9$ and a breadth given by $x - 3$.



- a. Show that the area can be written as

2

$$A(x) = x^2 - 12x + 27$$

The actual area of the rectangle is 72cm^2

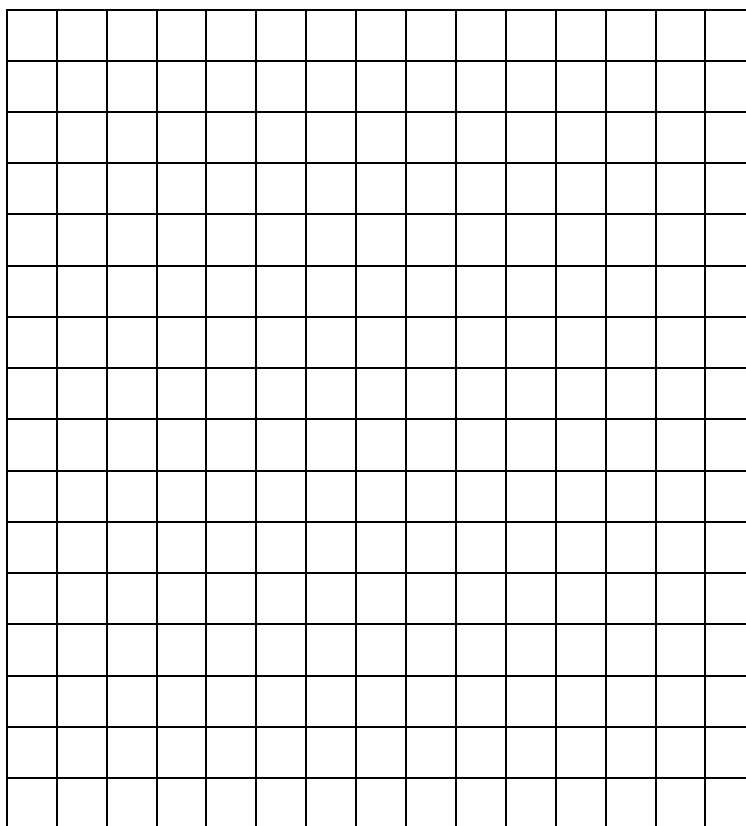
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- b. Calculate the value(s) of x that give the area 72cm^2 .

16. Two vectors, a and b , have components $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ and $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$.

2

Sketch the vector $2a + 3b$.



17. Write $x^2 + 7x + 5$ in the form $(x + p)^2 - q$

2

18. A function, on a suitable domain, is defined by

3

$$f(x) = \frac{2}{3}(x + 5)$$

Find the value of P where $f(P) = 6$

END OF PAPER