



Practice Paper D

Paper 2 – Calculator

Total Marks – 60

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. A painting increased by 10% in the first year after it was purchased at 12% in the next two years. 2

The painting was originally valued of £350.

Find the value of the painting 3 years after it was purchased.

Give your answer to two significant figures

2. A straight line has the equation

$$3x - 4y = 12$$

- (a) State the gradient and  $y$ -intercept of the straight line above. 3

- (b) State the coordinates where the line crosses the  $x$  axis. 1

3. (a) Simplify fully

2

$$\frac{(4x^{-2})^3}{18x^4}$$

(b) Find  $f(5)$  where

2

$$f(x) = 7x^{-1} + x$$

4. Two coordinates,  $a$  and  $b$ , on a suitable scale are given by  $a(3, -1, 2)$  and  $b(6, 1, 4)$ . 3

Find the distance between  $a$  and  $b$ .

5. Three apples and four flapjacks cost £6.24

(a) Write an equation to illustrate this information

1

Two apples and five flapjacks cost £7.23

(b) Write an equation to illustrate this information

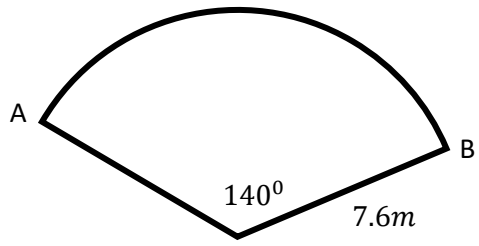
1

(c) Find the cost of one apple and one flapjack.

3

6.

3



Find the length of the arc.

7. A parabola has the equation  $y = x^2 - 6x + 8$

(a) State the y-intercept of this parabola 1

(b) Find the roots 3

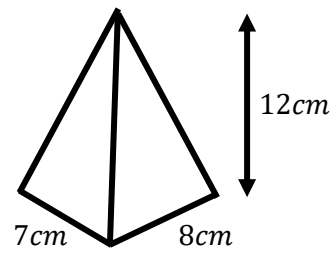
(c) State the axis of symmetry 1

(d) State the turning point of this curve. 1



8.

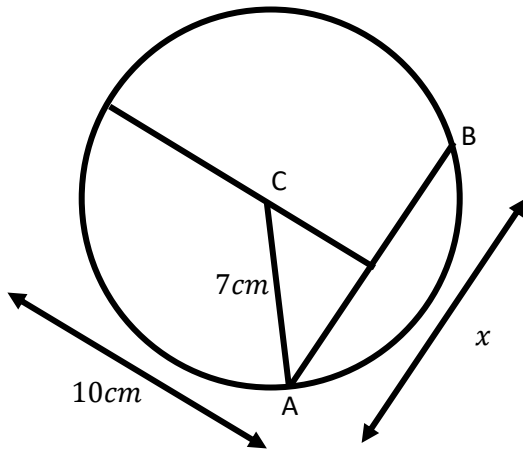
2



Find the volume of the pyramid.

9.

3



- $AC$  is the radius of the circle
- $AB$  is a chord and is a tangent to the radius.

Calculate the value of  $x$ , the length of the chord  $AB$

10. Find the roots of the curve

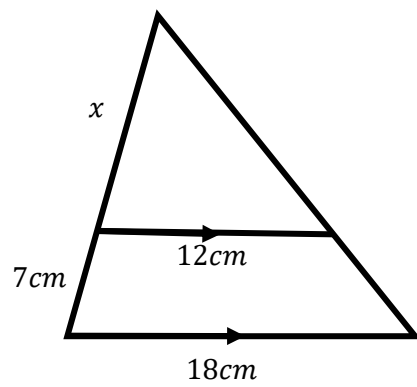
3

$$y = 2x^2 + 6x + 1.$$

Give your answer to 2 significant figures.

11.

3



Find the value of  $x$

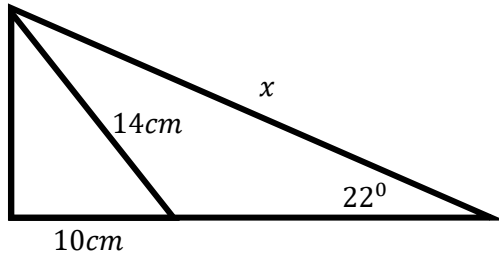
12. Solve for  $x$ , where  $0 \leq x \leq 360^\circ$

3

$$6 \sin x + 4 = 1$$

13.

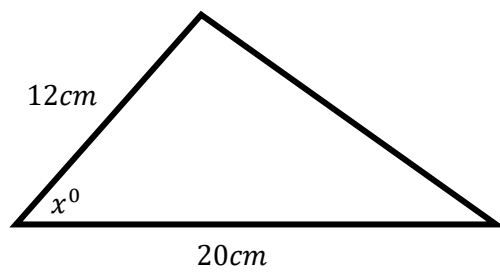
4



Find the value of  $x$ .

14. The area of this triangle is  $50.6\text{cm}^2$ .

3



Find the size of the angle  $x^\circ$ .

15. Below is the speed, in seconds, that ten students took to recite the 9 times table.

7, 4, 8, 12, 9, 5, 8, 9, 13, 10

(a) Find the median 1

(b) State the lower and upper quartiles 2

(c) Find the semi-interquartile range 1

(d) A second set had a median of 10 seconds and a semi-interquartile range of 1.8. 2

Write two comments comparing each group.

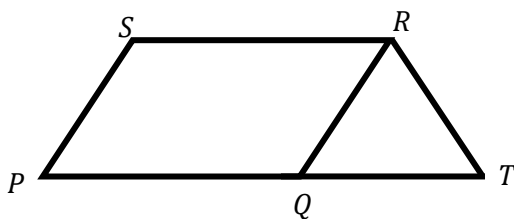
16. A house was valued at £230 000 in 2017.

3

In 2019 it was valued at £248 000.

Calculate the increase as a percentage of the original.

17.



- $PQRS$  is a parallelogram
- $\overrightarrow{PQ} = a$
- $\overrightarrow{QR} = b$
- $2\overrightarrow{PQ} = \overrightarrow{QT}$

(a) Write  $\overrightarrow{SR}$  in terms of  $a$

1

(b) Write  $\overrightarrow{RT}$  in terms of  $a$  and  $b$ .

1

(c) Hence write  $\overrightarrow{ST}$  in terms of  $a$  and  $b$ .

1