

Practice Paper I Answers

Paper 1

1. Evaluate $2\frac{1}{3} + \frac{5}{6} \times 1\frac{2}{5}$. 3

$\frac{7}{2}$ or $3\frac{1}{2}$

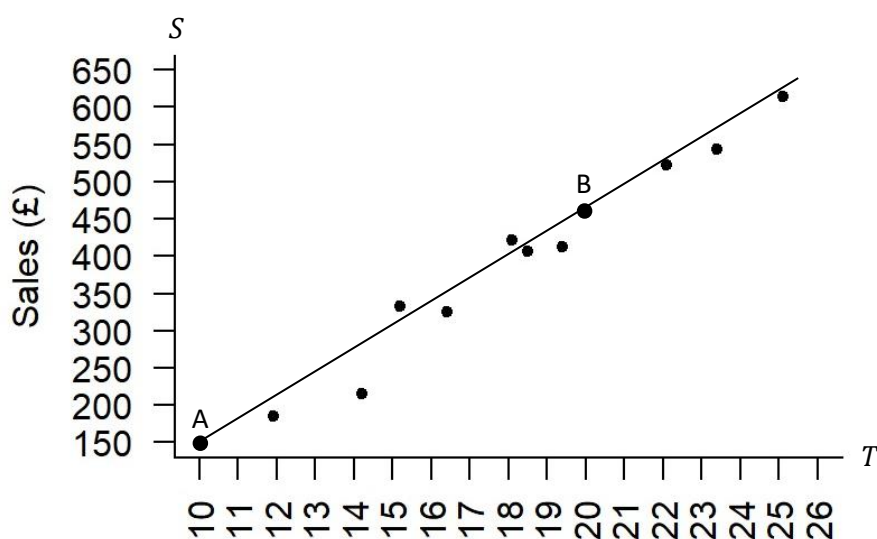
2. Solve the inequality $5 - x > 2(x + 1)$. 2

$1 > x$ or $x < 1$

3. Factorise $2p^2 - 5p - 12$ 2

$(2p + 3)(p - 4)$

4. The diagram shows a scattergraph plotting temperature (T) against sales (S) for a seafront cafe.
Point A represents a day with a temperature of 10 degrees and sales of 150 pounds.
Point B represents a day with a temperature of 20 degrees and sales of 450 pounds.



A line of best fit has been drawn on the scattergraph, which passes through the points A and B.

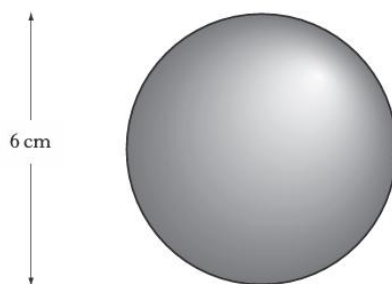
- a) Determine the equation of the line of best fit in terms of T and S . 3

$S = 30T - 150$

- b) Use your answer to part a) to predict sales for a day with a temperature of 11 degrees. 1

£180

5. The diagram below represents a sphere.



The sphere has a diameter of 6 centimetres.

Calculate its volume.

Take $\pi = 3.14$.

2

$$113.04 \text{ cm}^3$$

6. Solve algebraically the system of equations:

$$2x - 3y = 7$$

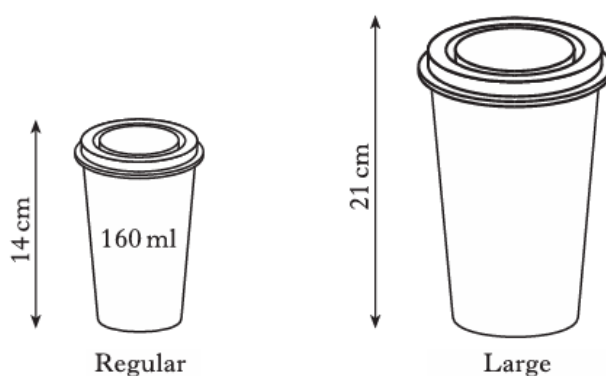
$$5x + 4y = 6$$

3

$$x = 2, y = -1$$

7. Coffee is sold in regular cups and large cups.

The two cups are mathematically similar in shape.



The regular cup is 14 centimetres high and holds 160 millimetres.

The large cup is 21 centimetres high.

Calculate how many millilitres the large cup holds.

4

$$540 \text{ ml}$$

8. a) Show that the standard deviation of 1, 1, 1, 2 and 5 is $\sqrt{3}$. 3

$\sqrt{3}$ with working

- b) **State** the standard deviation of 101, 101, 101, 102 and 105. 1

$\sqrt{3}$, no working required

9. Cleano washing powder is on special offer.



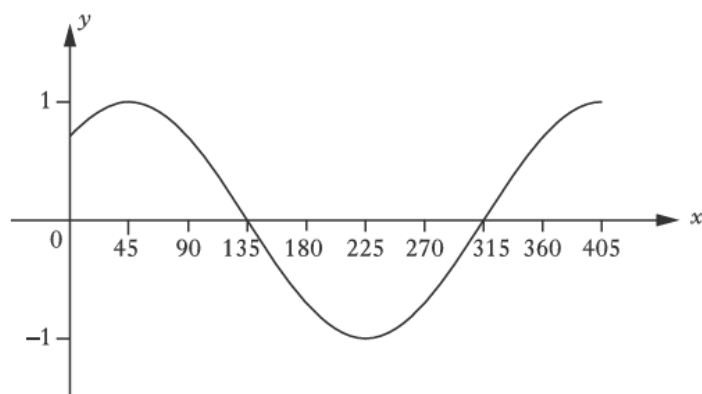
Each box on special offer contains 20% more powder than the standard box.

A box on special offer contains 900 grams.

How many grams does the standard box hold? 3

750 grams

10. The graph shown below has an equation of the form $y = \cos(x - a)^\circ$.



Write down the value of a . 1

$a = 45$

11. Express $\frac{12}{\sqrt{2}}$ with a rational denominator.
Give your answers in its simplest form. 2

$$6\sqrt{2}$$

12. A straight line passes through the points $(4, -1)$ and $(k, 5)$.
The line has a gradient of 3.
Determine the value of k . 3

$$k = 6$$

13. Given that $f(x) = \sqrt{x + 2}$, evaluate $f(46)$.
Give your answer as a **simplified surd**. 2

$$4\sqrt{3}$$

14. Factorise $27 - 3a^2$ fully. 2

$$3(3 + a)(3 - a)$$

15. Simplify $\frac{h^4 \times 3h^5}{(\sqrt{h})^4}$. 3

$$3h^7$$

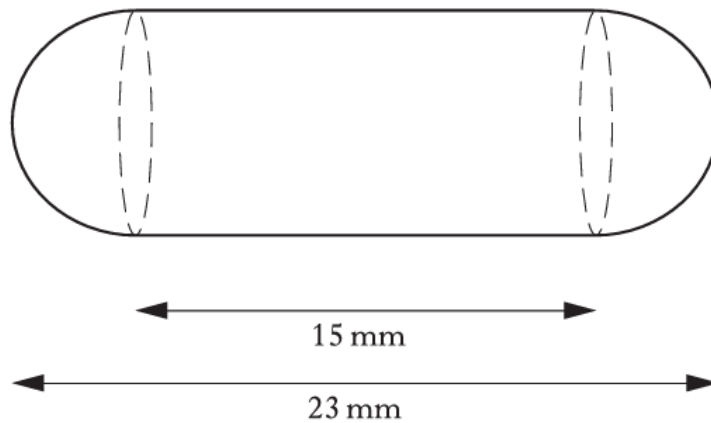
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Paper 2

1. A number of years ago the value of a second-hand car was determined to be £5900.
For the next two years, it **depreciated** in value by 12% each year.
The following year, it **appreciated** in value by 7%.
Determine the new value of the car. 3
£4888.79
2. Solve the inequation $4 + \frac{x-2}{3} \leq 6$. 3
 $x \leq 8$
3. A function is defined as $f(x) = 7 - 3x$.
Given $f(t) = 10$, determine the value of t . 2
 $t = -1$
4. A straight line is represented by the equation $x + 2y = 6$.
a) Find the gradient of this line. 2
 $m = -\frac{1}{2}$
- b) Write down the coordinates of the point where this line crosses the y -axis. 1
(0,3)
5. Express in its simplest form $y^8 \times (y^3)^{-2}$ 2
 y^2

6. A health food shop produces cod liver oil capsules for its customers.

Each capsule is in the shape of a cylinder with hemispherical ends as shown below.



The total length of the capsule is 23 millimetres and the length of the cylinder is 15 millimetres.

Calculate the volume of the cod liver oil capsule.

Give your answer correct to three significant figures.

5

$$1020 \text{ cm}^3$$

7. Expand and simplify $(2x - 1)(x^2 + 5x - 3)$

3

$$2x^3 + 9x^2 - 11x + 3$$

8. Make r the subject of $V = \frac{4}{3}\pi r^3$

3

$$r = \sqrt[3]{\frac{3V}{4\pi}}$$

9. Simplify $\frac{x^2 - 49}{x^2 + 6x - 7}$

3

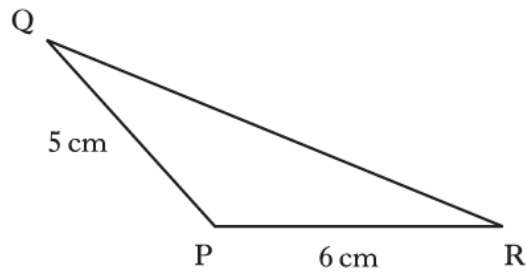
$$\frac{x-7}{x-1}$$

10. Solve the equation $x(x - 5) = 14$

3

$$x = -2, x = 7$$

11. In triangle PQR



- $PQ = 5$ centimetres
- $PR = 6$ centimetres
- Area of triangle PQR = 12 square centimetres
- Angle PQR is **obtuse**

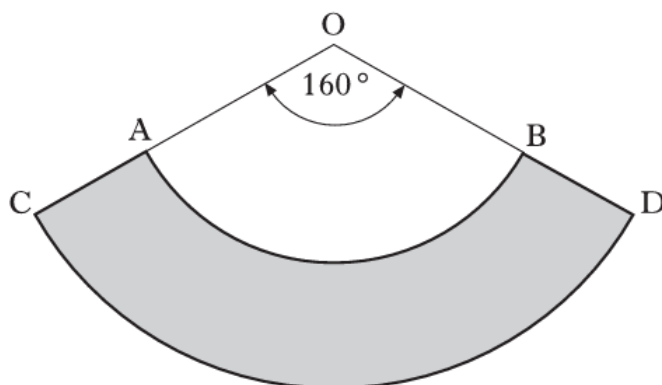
Calculate the size of angle QPR

4

126.9°

12. A pet shop manufactures protective dog collars.

In the diagram below the shaded area represents one of these collars.



AB and CD are arcs of the circles with centres at O.

The radius of the smaller circle, OA, is 10 inches.

The radius of the larger circle, OC, is 18 inches.

Angle AOB is 160° .

Calculate the area of the collar.

4

312.8cm³

13. Simplify $\sqrt{49x} - 2\sqrt{9x} + \sqrt{x}$.

Give your answer in the form $a\sqrt{x}$.

3

2√x

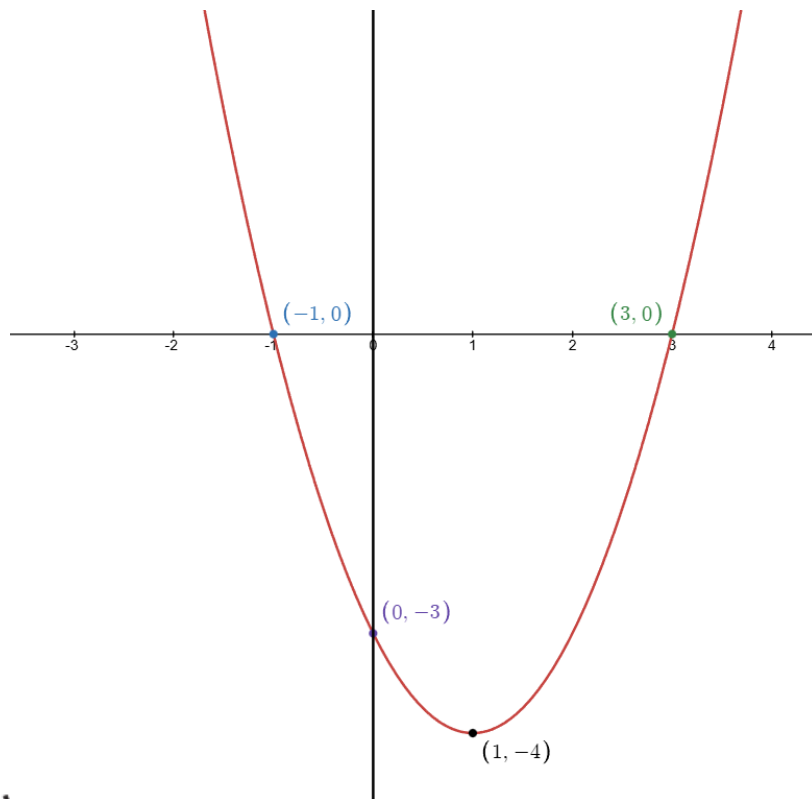
14. Sketch the graph of $y = x^2 - 2x - 3$ showing:

- The point at which the graph intersects the y -axis.
- The points at which the graph intersects the x -axis.
- The turning point of the graph.

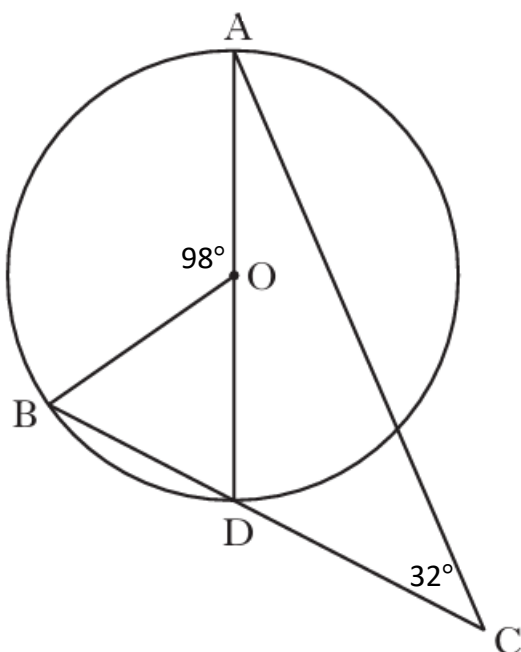
Use the axes provided. An additional diagram, if required, can be found at end.

4

Parabola sketched as below, showing each of the four coordinates clearly.



15.



AD is a diameter of a circle, centre O.

B is a point on the circumference of the circle.

The chord BD is extended to point C, outside the circle.

Angle BOA = 98° .

Angle DCA = 32° .

The radius of the circle is 7 centimetres.

Calculate the length of AC.

5

14.2cm