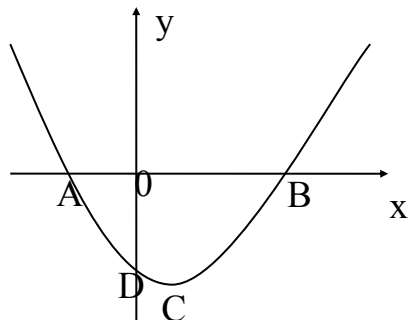


National 5 Prelim Revision

1. Solve the quadratic equation $2x^2 - 6x + 1 = 0$, giving your answers correct to 2 decimal places.

2.



The diagram shows the graph of the quadratic $y = x^2 - 6x - 7$.

The graph cuts the x axis at points A and B and the y axis at point D.

The quadratic has a minimum turning point at C.

Determine the coordinates of points A, B, C and D.

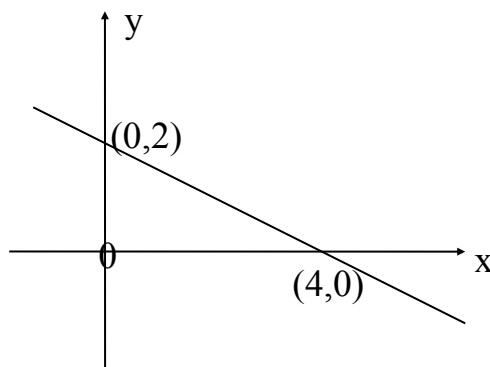
3. Simplify the following a) $(3x^2)^4$ b) $5x^3 \times 8x^4$ c) $\frac{12y^2}{5y^4}$ d) $(x^3y^2)^5$

4. Factorise and solve a) $3x^2 + 7x = 0$ b) $3x^2 - 4x + 1 = 0$

5. If $f(x) = 8^x$ evaluate a) $f(0)$ b) $f(\frac{2}{3})$ c) $f(-2)$

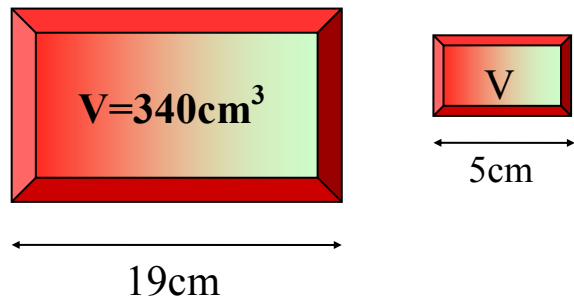
6. Find the values of x which satisfy $3x + 1 \geq x - 3$, where x is a whole number.

7. Find the equation of the straight line shown in the diagram.



8. A function $f(x) = 2x^2 - 5$.
 Find the values of a) $f(10)$ b) $f(-2)$
 If $f(t) = 25$, find the value of t .

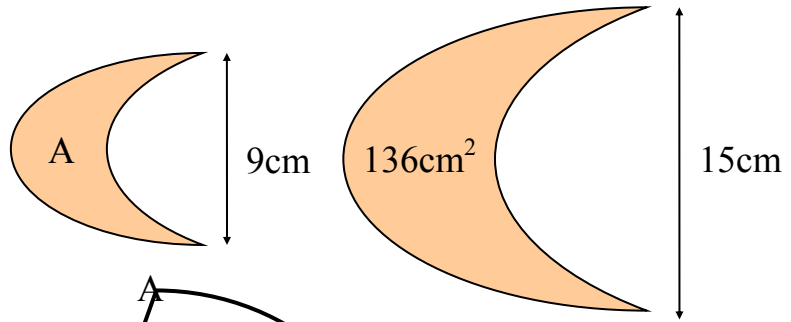
9. The two bevel shapes shown are similar.
 Calculate the volume of the smaller shape.



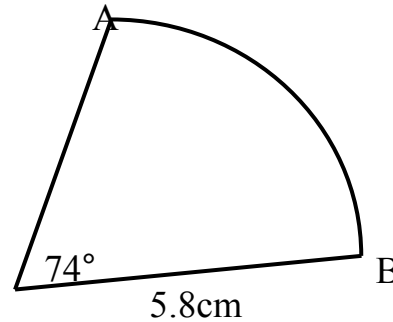
10. Write as a single fraction

$$\frac{2x + 1}{3} - \frac{x - 1}{4}$$

11. The shapes shown are similar. Find area A.



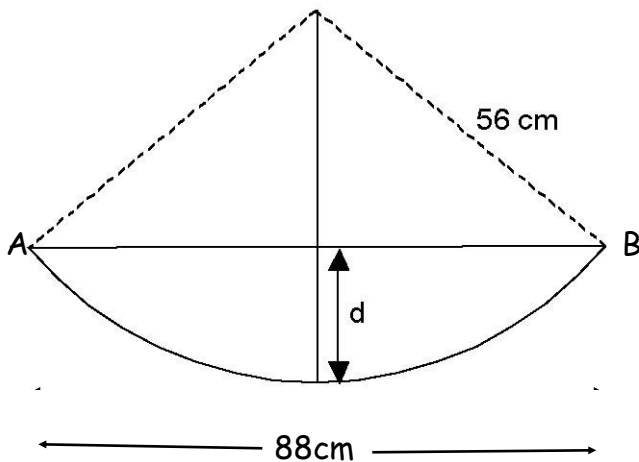
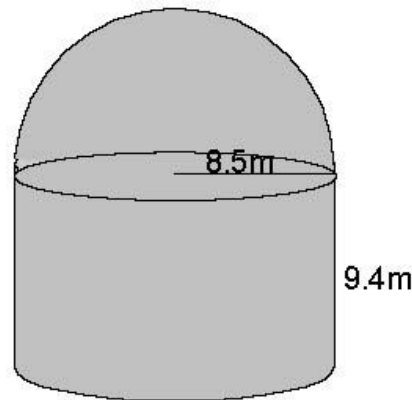
12. The diagram shows an arc AB
 of a circle of radius 5.8 cm .
 The angle subtended at the centre of the
 circle by the arc is 74° . Find



- (a) The length of arc AB .
 (b) The area of the sector.

13. The storage barn is a cylinder with
 A hemisphere on top.

Calculate the volume of the barn.



14. The diagram shows the sector of a
 Circle, radius 56 cm .
 AB is a chord of length 88 cm .

Calculate the distance, $d \text{ cm}$.

14. Express the algebraic fraction in its simplest form.

$$\frac{x^2 - 9}{3x^2 - 7x - 6}$$

15. Simplify $\sqrt{75} + \sqrt{48} - \sqrt{108}$.

16. Calculate the gradient of the line joining the points A(-1,-1) and B(-7,2).

17. Solve the equation $x(x - 1) = 5$ giving your answers correct to 1 decimal place.

18. If $P=4(L + B)$, change the subject of the formula to L and hence find L when $P = 68$ and $B = 6.5$.

19. A satellite completes an orbit of length 2.6×10^4 miles in 9.2×10^{-1} hours. Calculate the average speed of the satellite giving your answer correct to 2 significant figures and in scientific notation.

20. Remove the brackets and simplify $(2x+1)(x-3)(x-4)$.

21. Write in its simplest form as a surd with a rational denominator.

$$\frac{6}{\sqrt{18}}$$

22. Solve the simultaneous equations

$$\begin{aligned}4x - 3y &= 11 \\ y &= x - 2\end{aligned}$$

23. Twelve expensive flower bulbs and eight cheap ones cost £22.80. Nine of the expensive ones and four of the cheap ones cost £15.90. Find the price of each kind of bulb.

24. Find the nature of the roots of the following:

$$(a) x^2 + 6x + 9 = 0 \quad (b) x^2 - 12x + 36 = 0 \quad (c) 3x^2 - 7x + 5 = 0$$

25. Sketch the following graphs for $0 \leq x \leq 360$

$$(a) y = 4\sin x^\circ \quad (b) y = \cos 2x^\circ \quad (c) y = 6\sin 2x^\circ \quad (d) y = \cos \frac{1}{2}x^\circ$$

26. Solve the following equations for $0 \leq x \leq 360$

$$(a) 2\sin x^\circ - 1 = 0 \quad (b) 3\cos x^\circ + 4 = 5 \quad (c) 1 + 5\sin x^\circ = 2 \quad (d) 2\tan x^\circ + 3 = 0$$

Answers

1. 2.82 or 0.18
2. A(-1, 0), B(7, 0), C(3, -16), D(0, -7)
3. (a) $81x^8$ (b) $40x^7$ (c) $12y^3/5$ (d) $x^{15}y^{10}$
4. $x = 0$ or $x = -7/3$ (b) $x = 1/3$
5. (a) 1 (b) 512 (c) $1/64$
6. $x \geq -2$
7. $y = -\frac{1}{2}x + 2$
8. (a) 195 (b) 3 (c) $\pm\sqrt{15}$
9. 6.2 cm^3
10. $\frac{5x - 1}{12}$
11. 48.96m^2
12. (a) 7.5 cm (b) 21.7cm^2
13. 3419.83 cm^3
14. 21.4 cm
15. $3\sqrt{3}$
16. $-\frac{1}{2}$
17. 2.8, -1.8
18. $L = \frac{P - 4B}{4}$, 10.5
19. 2.8×10^4
20. $2x^3 - 13x^2 + 17x + 12$
21. $\sqrt{2}$
22. $x = 17/7, y = 3/7$
23. Expensive £1.50, cheap £0.60
24. (a) Equal roots (b) Equal roots (c) No real roots
25. Show your teacher the graphs.
26. (a) $30^\circ, 150^\circ$ (b) $70.5^\circ, 303.7^\circ$ (c) $11.5^\circ, 168.5^\circ$ (d) $123.7^\circ, 303.7^\circ$