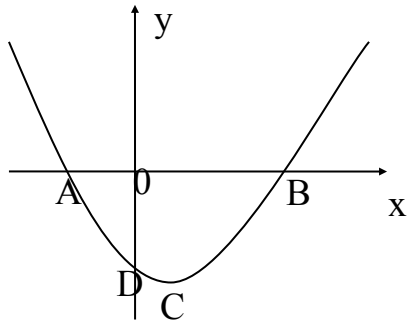
# National 5
# Prelim Revision

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.

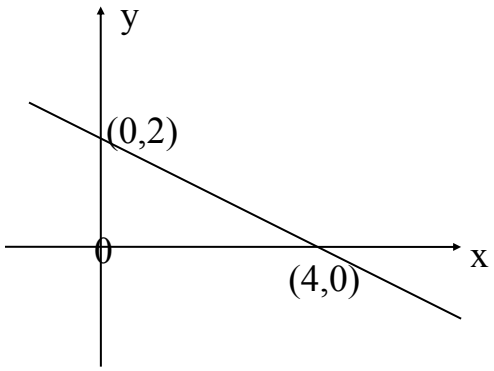
3. Simplify the following a) $(3x^2)^4$ b) $5x^3 \times 8x^4$ c) $\frac{12y^2}{5y^4}$ d) $(x^3y^2)^5$

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) $f(-2)$

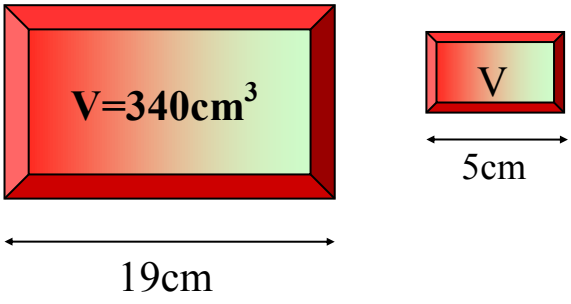
6. Find the values of x which satisfy $3x + 1 \geq x - 3$, where x is a whole number.

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



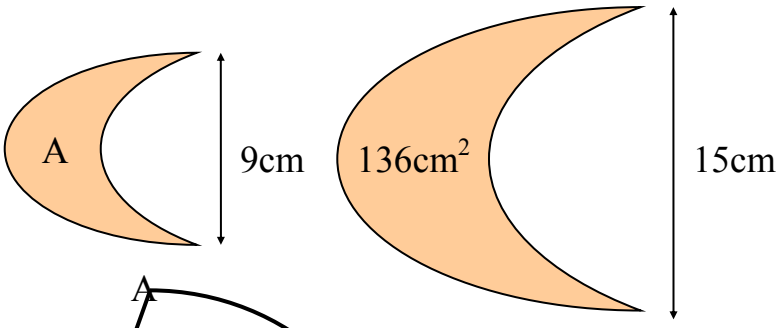
8. A function $f(x) = 2x^2 - 5$.
Find the values of a) f(10) b) f(-2)
If f(t) = 25, find the value of t.

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



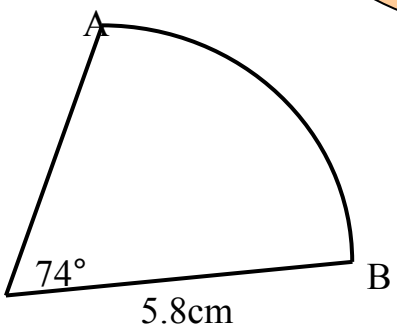

10. Write as a single fraction $\frac{2x+1}{3} - \frac{x-1}{4}$

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



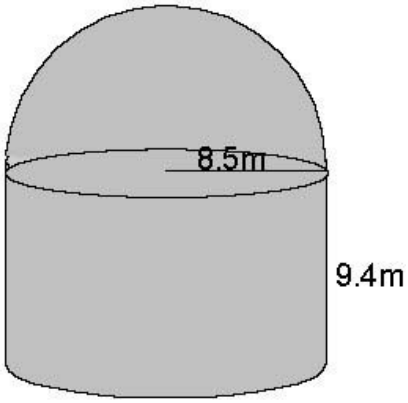

12. The diagram shows an arc AB of a circle of radius 5.8cm.
The angle subtended at the centre of the circle by the arc is 74°. Find

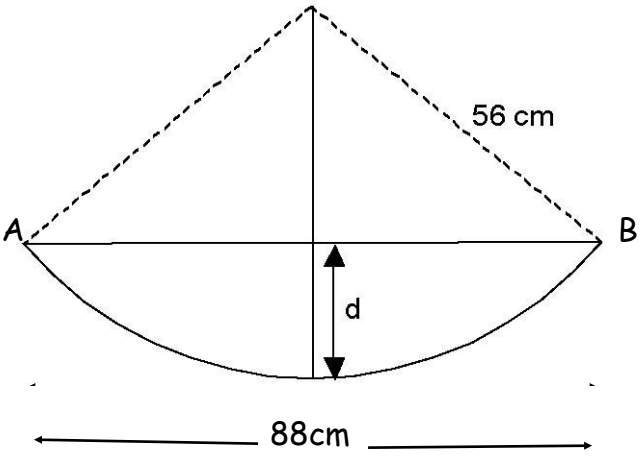
(a) The length of arc AB.
(b) The area of the sector.




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 56cm.
AB is a chord of length 88cm.

Calculate the distance, dcm.

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 $2.6 \times 10^4$ miles in $9.2 \times 10^{-1}$ 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

$$4x - 3y = 11$$

$$y = x - 2$$

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

# 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. 11. 48.96$m^2$ 12. (a) 7.5 cm (b) 21.7$cm^2$

13. 3419.83 $cm^3$ $\frac{5x - 1}{12}$ 14. 21.4 cm 15. $3\sqrt{3}$ 16. $-\frac{1}{2}$

17. 2.8, -1.8 18. L = , 10.5

19. $2.8 \times 10^4$ 20. $2x^3 - 13x^2 \frac{P - 4B}{4} + 17x + 12$ 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