

Solving Quadratic Equations

All solutions to quadratics must be in the simplest radical form i.e. $x = \frac{a \pm b\sqrt{c}}{d}$ where a, b, c and d are integers, c is the lowest possible value, a, b and d are in the lowest terms, and d is positive.

Level 1 – 2

1. Solve the following:

a) $x^2 = 1$

.....
.....

b) $x(x + 3) = 0$

.....
.....

c) $x^2 - 49 = 0$

.....
.....

d) $(x + 7)(x - 2) = 0$

.....
.....

e) $-3(x - 1)(x - 8) = 0$

.....
.....

f) $x^2 - 4x = 0$

.....
.....

Level 3 – 4

2. Solve the following. You must use all three methods once: factorizing, completing the square, quadratic formula.

a) $5x^2 - 4x - 1 = 0$

.....
.....
.....
.....

b) $x^2 + 4x - 2 = 0$

.....
.....
.....
.....

c) $2x^2 + 5x + 1 = 0$

.....
.....
.....
.....

3. For the equation $x^2 + 4x + 4 = 0$

a) Calculate the value of the discriminant

.....

b) Hence, without solving determine how many solutions the equation has. Justify your answer.

.....
.....
.....

Level 5 – 6

4. If the lengths of all sides of a square are increased by 4 cm the new area is 9 times the old area. Let x represent the length of the original square.

a) Write down an expression for the area of the original square.

.....

b) Use your answer to a) to write down an expression for the area of the new square.

.....

c) Using the information given in the question determine a different expression for the area of the new square. Clearly explain your method.

.....

.....

.....

.....

d) Using your answers to b) and c) determine the value of x .

.....

.....

.....

.....

5. Solve the equation $\frac{x+1}{x-1} = \frac{5x-3}{2x}$.

.....

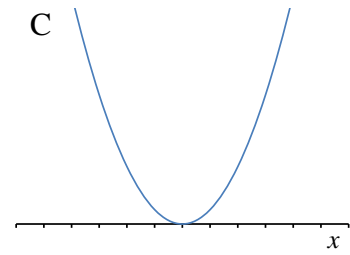
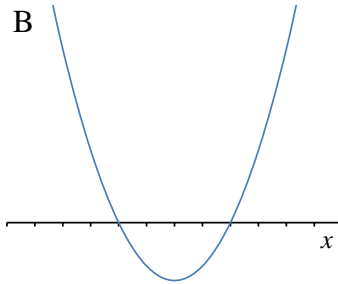
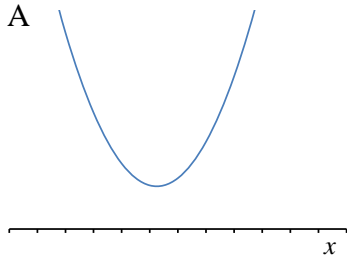
.....

.....

.....

.....

6. Use the discriminant to match each graph with the correct equation. The y-axis of each graph is hidden. The scales on the x-axes are not necessarily equal. *Clearly* justify your answer.



Choose from the following equations:

$$y = x^2 + 10x + 16$$

$$y = x^2 - 3x + 5$$

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

The equation of A is:

Reason:

.....

.....

The equation of B is:

Reason:

.....

.....

The equation of C is:

Reason:

.....

.....

7. Explain why the equation $y = x^2 + (k + 3)x + k$ cannot have only one solution.

.....

.....

.....

.....

.....

.....

8. Bob wishes to build a fence in the shape of a rectangle. He has 60 m of fence and he would like the area of the rectangle to be 200 m^2 . Determine the possible values for the length and width of the rectangle.

.....

.....

.....

.....

.....

.....