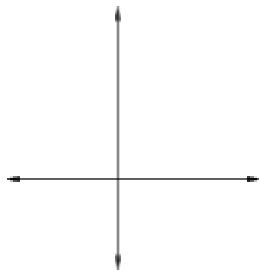


Investigation

Use the quadratic formula to determine the roots. Make a rough sketch of the graph. **Under each sketch clearly state the number of roots.**

a) $y = -2x^2 - 16x - 33$

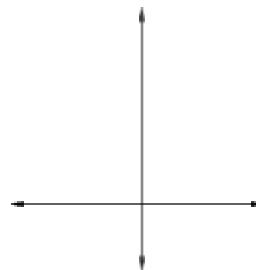
[3]



Number of roots _____

b) $y = x^2 + 8x + 12$

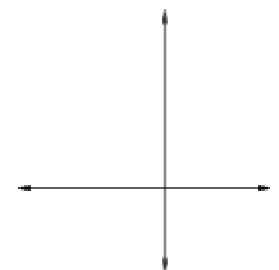
[3]



Number of roots _____

c) $y = 3x^2 + 24x + 48$

[3]



Number of roots _____

$b^2 - 4ac$ is the part of the quadratic formula that is called the **discriminant**.

Examine your three graphs. Explain how you could use the discriminant to determine the number of roots an equation has, without having to actually calculate the roots. [3]

Use your theory about the discriminant to determine the number of roots for each of the following equations.[6 marks - 2 marks each]

Note: You must use the discriminant. No marks will be awarded for calculating the roots!

a) $2x^2 + 4x - 16 = 0$

b) $-3x^2 + 12x - 12 = 0$

$$c) -2x^2 + 8x - 13 = 0$$