

ANSWERS => NUMBER AND TYPE OF ROOTS OF QUADRATIC EQUATIONS

35. $2x^2 + 3x - 10 = 0$
 $a=2; b=3; c=-10$

$$D = b^2 - 4ac \\ = (3)^2 - 4(2)(-10) \\ = 9 + 80 \\ = 89$$

Since $D > 0$, there are two real roots.

36. $9x^2 - 12x + 4 = 0$
 $a=9; b=-12; c=4$

$$D = b^2 - 4ac \\ = (-12)^2 - 4(9)(4) \\ = 144 - 144 \\ = 0$$

Since $D=0$, there will be one real root

37. $3x^2 - 7x + 5 = 0$
 $a=3; b=-7; c=5$

$$D = b^2 - 4ac \\ = (-7)^2 - 4(3)(5) \\ = 49 - 60 \\ = -11$$

Since $D < 0$, there will be two imaginary roots.

38. $y = x^2 + 8x + 16$
 $a=1; b=8; c=16$

$$D = b^2 - 4ac \\ = (8)^2 - 4(1)(16) \\ = 64 - 64 \\ = 0$$

Since $D=0$, the quadratic equation will have one real root.

Therefore, the quadratic function will have one x -intercept.

39. $y = 5x^2 + 2x + 1$
 $a=5; b=2; c=1$

$$D = b^2 - 4ac \\ = (2)^2 - 4(5)(1) \\ = 4 - 20 \\ = -16$$

Since $D < 0$, the quadratic equation will have two imaginary roots.

Therefore, the quadratic function will have no x -intercepts.

40. $y = 7x^2 + 6x$
 $a=7; b=6; c=0$

$$D = b^2 - 4ac \\ = (6)^2 - 4(7)(0) \\ = 36 - 0 \\ = 36$$

Since $D > 0$, the quadratic equation will have two real roots.

Therefore, the quadratic function will have two x -intercepts.

41. $y = x^2 - 13x + 42$
 $a=1; b=-13; c=42$

$$D = b^2 - 4ac \\ = (-13)^2 - 4(1)(42) \\ = 169 - 168 \\ = 1$$

Since $D > 0$, the quadratic equation will have two real roots.

Therefore, the quadratic function will have two x -intercepts.

42. $3x^2 + 4x + c = 0$
 $a=3, b=4, c=c$

a) For two real roots, the discriminant must be greater than 0.

$$\begin{aligned} b^2 - 4ac &> 0 \\ (4)^2 - 4(3)(c) &> 0 \\ 16 - 12c &> 0 \\ \frac{-12c}{-12} &> \frac{-16}{-12} \\ c &< \frac{16}{12} \\ c &< \frac{4}{3} \text{ (lowest terms)} \end{aligned}$$

All values of "c" less than $\frac{4}{3}$ will result in two real solutions.

b) For one real root, the discriminant must equal zero.

$$\begin{aligned} b^2 - 4ac &= 0 \\ (4)^2 - 4(3)(c) &= 0 \\ 16 - 12c &= 0 \\ \frac{-12c}{-12} &= \frac{-16}{-12} \\ c &= \frac{4}{3} \text{ (lowest terms)} \end{aligned}$$

The only "c" value that will result in one real root is $\frac{4}{3}$.

c) For no real roots (2 imaginary roots), the discriminant must be less than 0.

$$\begin{aligned} b^2 - 4ac &< 0 \\ (4)^2 - 4(3)(c) &< 0 \\ 16 - 12c &< 0 \\ \frac{-12c}{-12} &< \frac{-16}{-12} \\ c &> \frac{4}{3} \end{aligned}$$

All values of "c" greater than $\frac{4}{3}$ will result in the equation having two imaginary roots.