

DO NOW:

Solve the quadratic equation using the method of your choice.

$$w^2 - 6w = 20 - 5w$$

$$\begin{array}{r} -5w - 20 - 20 + 5w \\ \hline w^2 - w - 20 = 0 \end{array}$$

$$a=1 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$b=-1$$

$$c=20$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(20)}}{2(1)}$$

$$\begin{array}{r} 20 \quad -1 \\ -5 \cdot 4 \quad -5 + 4 \end{array}$$

$$x = \frac{1 \pm \sqrt{1 + 80}}{2}$$

$$(w - 5)(w + 4) = 0$$

$$\begin{array}{l|l} w - 5 = 0 & w + 4 = 0 \\ \hline w = 5 & w = -4 \end{array}$$

$$x = \frac{1 \pm \sqrt{81}}{2}$$

$$x = \frac{1 \pm 9}{2} \quad \left(\begin{array}{l} \frac{1+9}{2} = 5 \\ \frac{1-9}{2} = -4 \end{array} \right)$$

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what is the discriminant?

The Quadratic formula is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The discriminant of the quadratic equation is:

$$b^2 - 4ac$$

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If the discriminant is....

2 solutions A (positive) perfect square
real, rational and unequal roots

VALU
of the
discriminant

D=24 A (positive) non-perfect square
real, irrational and unequal roots

2 solutions

Zero
real, rational and equal roots 1 solution

No solution Any negative number
no real roots

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What is the value of the discriminant?

How many solutions does the quadratic have?

EXAmPle 1: $x^2 - 4x + 3 = 0$ $(x-3)(x-1) = 0$
 $x = 3, 1$

$a = 1$
 $b = -4$
 $c = 3$

$b^2 - 4ac$
 $(-4)^2 - 4(1)(3)$
 $16 - 12$
 4

Factorable

Conclusion:
2 solutions
Real, Rational & unequal

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What is the value of the discriminant?

How many solutions does the quadratic have?

EXamPle 2: $x^2 + 2x + 1 = 0$

$$\begin{array}{l} a=1 \\ b=2 \\ c=1 \end{array} \quad \begin{array}{l} b^2 - 4ac \\ (2)^2 - 4(1)(1) \\ 4 - 4 \\ 0 \end{array}$$

FACTORABLE

Conclusion:

1 solution
Real, Rational & Equal

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What is the value of the discriminant?

How many solutions does the quadratic have?

EXamPle 3: $x^2 - 2x + 2 = 0$

$$\begin{array}{l} a=1 \\ b=-2 \\ c=2 \end{array} \quad \begin{array}{l} b^2 - 4ac \\ (-2)^2 - 4(1)(2) \\ 4 - 8 \\ -4 \end{array}$$

Not
Factorable

Conclusion:

No Real Roots / No Solution

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What is the value of the discriminant?

How many solutions does the quadratic have?

$$x^2 - 2x = 1$$

$$x^2 - 2x - 1 = 0$$

$$b^2 - 4ac$$
$$(-2)^2 - 4(1)(-1)$$
$$4 + 4$$

8

2 roots

Conclusion:

Real irrational unequal

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