

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

DS  
1  
4  
9  
16  
25  
36  
49  
64  
81  
100

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Date \_\_\_\_\_  
Algebra 2

## Solving Quadratic Equations Using the Quadratic Formula

1.  $x^2 + x = 1$   
-1 -1

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

a=1  
b=1  
c=-1

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

$$x = \frac{-1 \pm \sqrt{5}}{2}$$

2.  $2x^2 + 6x - 3 = 0$

a=2  
b=6  
c=-3

$$x = \frac{-6 \pm \sqrt{(6)^2 - 4(2)(-3)}}{2(2)}$$

$$\sqrt{60}$$

$$\sqrt{4} \sqrt{15}$$

$$2\sqrt{15}$$

$$x = \frac{-6 \pm \sqrt{60}}{4}$$

$$x = \frac{-6 \pm 2\sqrt{15}}{4}$$

$$x = \frac{-3 \pm \sqrt{15}}{2}$$

3.  $x^2 + 4x = -8$   
+8 +8

$$x^2 + 4x + 8 = 0$$

a=1  
b=4  
c=8

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4(1)(8)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{-16}}{2}$$

$$\sqrt{-16}$$

$$i\sqrt{16}$$

$$4i$$

$$x = \frac{-4 \pm 4i}{2}$$

$$x = -2 \pm 2i$$

4.  $x^2 - 6x = 9$   
-9 -9

$$x^2 - 6x - 9 = 0$$

a=1  
b=-6  
c=-9

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(-9)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{72}}{2}$$

$$\sqrt{72}$$

$$\sqrt{36} \sqrt{2}$$

$$6\sqrt{2}$$

$$x = \frac{6 \pm 6\sqrt{2}}{2}$$

$$x = 3 \pm 3\sqrt{2}$$

5.  $2x^2 - 6x = -5$   
+5 +5

$$2x^2 - 6x + 5 = 0$$

a=2  
b=-6  
c=5

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(2)(5)}}{2(2)}$$

$$x = \frac{6 \pm \sqrt{-4}}{4}$$

$$\sqrt{-4}$$

$$i\sqrt{4}$$

$$2i$$

$$x = \frac{6 \pm 2i}{4}$$

$$x = \frac{3 \pm i}{2}$$

$$x = \frac{3 \pm i}{2}$$

6.  $3x^2 = 4x - 2$   
-4x +2

$$3x^2 - 4x + 2 = 0$$

a=3  
b=-4  
c=2

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(3)(2)}}{2(3)}$$

$$x = \frac{4 \pm \sqrt{-8}}{6}$$

$$\sqrt{-8}$$

$$i\sqrt{8}$$

$$i\sqrt{4} \sqrt{2}$$

$$2i\sqrt{2}$$

$$x = \frac{4 \pm 2i\sqrt{2}}{6}$$

$$x = \frac{2 \pm i\sqrt{2}}{3}$$

$$x = \frac{2 \pm i\sqrt{2}}{3}$$

7.  $x^2 - 6x + 4 = 0$

$a=1$   
 $b=-6$   
 $c=4$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(4)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{20}}{2}$$

$$\begin{array}{c} \sqrt{20} \\ \swarrow \searrow \\ \sqrt{4} \quad \sqrt{5} \\ 2\sqrt{5} \end{array}$$

$$x = \frac{6 \pm 2\sqrt{5}}{2}$$

$$x = 3 \pm \sqrt{5}$$

8.  $4x^2 + 4x = 5$

$-5 \quad -5$   
 $4x^2 + 4x - 5 = 0$

$a=4$   
 $b=4$   
 $c=-5$

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4(4)(-5)}}{2(4)}$$

$$x = \frac{-4 \pm \sqrt{96}}{8}$$

$$\begin{array}{c} \sqrt{96} \\ \swarrow \searrow \\ \sqrt{16} \quad \sqrt{6} \\ 4\sqrt{6} \end{array}$$

$$x = \frac{-4 \pm 4\sqrt{6}}{8}$$

$$x = \frac{-1 \pm \sqrt{6}}{2}$$

9.  $x^2 - 6x = -3$   
 $+3 \quad +3$

$$x^2 - 6x + 3 = 0$$

$a=1$   
 $b=-6$   
 $c=3$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(3)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{24}}{2}$$

$$\begin{array}{c} \sqrt{24} \\ \swarrow \searrow \\ \sqrt{4} \quad \sqrt{6} \\ 2\sqrt{6} \end{array}$$

$$x = \frac{6 \pm 2\sqrt{6}}{2}$$

$$x = 3 \pm \sqrt{6}$$

10.  $4x^2 + 2x = -1$   
 $+1 \quad +1$

$$4x^2 + 2x + 1 = 0$$

$a=4$   
 $b=2$   
 $c=1$

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

$$x = \frac{-2 \pm \sqrt{-12}}{8}$$

$$\begin{array}{c} \sqrt{-12} \\ \swarrow \searrow \\ 2\sqrt{3} \quad \sqrt{-1} \\ 2i\sqrt{3} \end{array}$$

$$x = \frac{-2 \pm 2i\sqrt{3}}{8}$$

$$x = \frac{-1 \pm i\sqrt{3}}{4}$$

$$x = \frac{-1 \pm i\sqrt{3}}{4}$$

11.  $4x^2 = 8x + 1$   
 $-8x - 1 \quad -8x - 1$

$$4x^2 - 8x - 1 = 0$$

$a=4$   
 $b=-8$   
 $c=-1$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(4)(-1)}}{2(4)}$$

$$x = \frac{8 \pm \sqrt{80}}{8}$$

$$\begin{array}{c} \sqrt{80} \\ \swarrow \searrow \\ \sqrt{16} \quad \sqrt{5} \\ 4\sqrt{5} \end{array}$$

$$x = \frac{8 \pm 4\sqrt{5}}{8}$$

$$x = \frac{2 \pm \sqrt{5}}{2}$$

12.  $2x^2 = 4x - 1$   
 $-4x + 1 \quad -4x + 1$

$$2x^2 - 4x + 1 = 0$$

$a=2$   
 $b=-4$   
 $c=1$

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

$$x = \frac{4 \pm \sqrt{8}}{4}$$

$$\begin{array}{c} \sqrt{8} \\ \swarrow \searrow \\ \sqrt{4} \quad \sqrt{2} \\ 2\sqrt{2} \end{array}$$

$$x = \frac{4 \pm 2\sqrt{2}}{4}$$

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