Sec. 9.6 The Quadratic Formula and the Discriminant

$$ax^2+bx+c=0$$

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

Solve:

a. $x^2-3x-10=0$

$a=1$, $b=-3$, $c=-10$

$$x=\frac{3\pm\sqrt{9-4(1)(-10)}}{2\cdot1}$$

$9+40$

$$=\frac{3\pm\sqrt{49}}{2}=\frac{3\pm7}{2}$$

$\frac{3+7}{2}=\frac{10}{2}=5$

$\frac{3-7}{2}=\frac{-4}{2}=-2$

b. $x^2-4x=21$

$-21\quad -21$

$x^2-4x-21=0$

$a=1$, $b=-4$, $c=-21$

$$x=\frac{4\pm\sqrt{16-4(1)(-21)}}{2\cdot1}$$

$16+84$

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

$$x=\frac{4\pm\sqrt{100}}{2}=\frac{4\pm10}{2}$$

$\frac{4+10}{2}=\frac{14}{2}$ $\quad\frac{4-10}{2}=\frac{-6}{2}$

$7, -3$

c. $3x^2-5x=-2$

$+2\quad +2$

$3x^2-5x+2=0$

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

$ax^2+bx+c=0$

$a=3$, $b=-5$, $c=2$

$$x=\frac{5\pm\sqrt{25-4(3)(2)}}{2\cdot3}$$

$25-24$

$$x=\frac{5\pm\sqrt{1}}{6}=\frac{5\pm1}{6}$$

$\frac{5+1}{6}=\frac{6}{6}=\boxed{1}$

$\frac{5-1}{6}=\frac{4}{6}=\boxed{\frac{2}{3}}$

Discriminant: b^2-4ac

b^2-4ac		real solutions
$\pm\sqrt{-}$	−	0
$\pm\sqrt{0}$	0	1
$\pm\sqrt{+}$	+	2

Problem 2: Find the discriminant and the number of real solutions.

a. $3x^2-7x+11=0$

$a=3$, $b=-7$, $c=11$

b^2-4ac

$49-4(3)(11)=-83$

0 real solutions

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

$+9 \quad +9$

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

$a=1$, $b=-6$, $c=9$

b^2-4ac

$36-4(1)(9)=36-36=0$

1 real solution

−	0	
0	1	
+	2	

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

$a=2$, $b=3$, $c=-4$

$b^2-4ac=9-4(2)(-4)$

$9+32$

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2 real solutions