

**Algebra 1 Benchmark 22.0**

**Topic: Discriminant**

1. How many times does the following graph intersect the x-axis?  $y=0$

$y = x^2 - 3x + 8$

$0 = x^2 - 3x + 8$

$a=1 \quad b=-3 \quad c=8$

$(-3)^2 - 4(1)(8)$

$9 - 32 = -23$

0 solutions

$b^2 - 4ac$   
⊕  
2 solutions

$b^2 - 4ac$   
⊖  
0 solutions

$b^2 - 4ac = 0$   
1 solution

2. How many solutions does the following quadratic equation have?

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

$5x - 2 = 2x^2 + 1$   
 $-5x \quad -5x$

$0 = 2x^2 - 5x + 1$

$a=2$

$b=-5$

$c=1$

$(-5)^2 - 4(2)(1)$

$25 - 8$   
17 +

2 solutions

**Algebra 1 Benchmark 23.0**

**Topic: Solving Quadratic Word Problems**

What if you throw an egg straight up in the air at an initial velocity of 20 ft/sec. How long will it take before it hits the ground, if you released the egg at an initial height of 4 ft?

$s = -16t^2 + v_0t + s_0$ ,  $s_0 = \text{initial height}$ ,  $v_0 = \text{initial velocity}$ ,  $s = \text{final height}$

$0 = -16t^2 + 20t + 4$   $s_0 = 4$   $v_0 = 20$   $s = 0$

$0 = -4t^2 + 5t + 1$

$a=-4$   
 $b=5$   
 $c=1$

$t = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(-4)(1)}}{2(-4)} = \frac{-5 \pm \sqrt{25+16}}{-8} = \frac{-5 \pm \sqrt{41}}{-8}$

$t = -0.175$   
 $t = 1.425$

**Algebra 1 Benchmark 12.0**

**Topic: Simplifying Rational Expressions**

Simplify the following expressions.

1.  $\frac{2x^2 - 18}{x^2 + 2x - 15} = \frac{2(x^2 - 9)}{(x+5)(x-3)} \cdot \frac{(x)^2 - (3)^2}{a^2 - b^2}$

$\frac{5 \times -3}{2}$

$\frac{2(x+3)(x-3)}{(x+5)(x-3)} = \frac{2(x+3)}{x+5}$

2.  $\frac{x^2 + 10xy + 25y^2}{2x^2 + 10xy}$

$\frac{25y^2}{5y \times 5y}$   
 $\frac{10y}{10y}$

$\frac{(x+5y)(x+5y)}{2x(x+5y)}$

$\frac{x+5y}{2x}$