CCGPS Analytic Geometry **Unit 5A Test Review (Factoring, Completing the Square, Quadratic Formula)**

Solve equation by factoring

1. $-8x + 6x^3 = 8x^2$

Factored Form: _____

Solution: _____

Solve equation by Completing the Square

2. $4x^2 + 8 = 16x$

3. a) Solve equation by quadratic formula
   b) Find the discriminant
   c) Based on the discriminant, find the number and the type of solutions

$2 - 3x^2 = 5x$

4. Solve equation choosing a method (this may be solved multiple ways)

$12x^4 = 44x^3 - 24x^2$

Solve equation by factoring

5. $-30x^2 + 24x^3 = 21x$

Factored Form: _____

Solution: _____

Solve equation by Completing the Square

6. $3x^2 - 15 = 12x$

7. a) Solve equation by quadratic formula
   b) Find the discriminant
   c) Based on the discriminant, find the number and the type of solutions

$4x - 2x^2 = 9$

8. Create a quadratic function that has solutions at $x = 2$, and $x = -1/2$. Make sure that it is written in standard form $ax^2 + bx + c = 0$

Solution Key

CCGPS Analytic Geometry **Unit 5A Test Review (Factoring, Completing the Square, Quadratic Formula)**

Solve equation by factoring

1. $-8x + 6x^3 = 8x^2$ $\quad 6x^3 - 8x^2 - 8x = 0$

$2x(3x^2 - 4x - 4) = 0$

$-6 \cdot 2 = -12$, $3 - 4 = -1$

$2x\left(x - \frac{6}{3}\right)\left(x + \frac{2}{3}\right)$

$2x(x-2)(3x+2)$

Factored Form: $2x(x-2)(3x+2)$

Solution: $x = 0, 2, -\frac{2}{3}$

Solve equation by Completing the Square

2. $4x^2 + 8 = 16x$ $\quad \frac{4x^2}{4} - \frac{16x}{4} + \frac{8}{4} = \frac{0}{4}$

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

$x^2 - 4x + \underline{4} = -2 + \underline{4}$

$\left(\frac{b}{2}\right)^2 = \left(\frac{-4}{2}\right)^2 = (-2)^2 = 4$

$(x-2)(x-2) = 2$

$(x-2)^2 = 2 \rightarrow \sqrt{(x-2)^2} = \pm\sqrt{2}$

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

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

3. a) Solve equation by quadratic formula
   b) Find the discriminant
   c) Based on the discriminant, find the number and the type of solutions

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

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

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

$\frac{5 \pm \sqrt{49}}{-6} = \frac{5 \pm 7}{-6}$

$x = \frac{5+7}{-6}$ and $x = \frac{5-7}{-6}$

$x = -2$ and $x = \frac{1}{3}$

4. Solve equation choosing a method (this may be solved multiple ways)

$12x^4 = 44x^3 - 24x^2$

$12x^4 - 44x^3 + 24x^2 = 0$

$4x^2(3x^2 - 11x + 6) = 0$

$-9 \cdot 18$, $3 - 11$

$\left(x - \frac{9}{3}\right)\left(x - \frac{2}{3}\right)$

$(x-3)(3x-2) = 0$

$x = 3, \frac{2}{3}$

Solve equation by factoring

5. $-30x^2 + 24x^3 = 21x$

$24x^3 - 30x^2 - 21x = 0$

$3x(8x^2 - 10x - 7) = 0$

$-14 \times 4 = -56$

$-14 + 4 = -10$

	-56	
-14		4
8	-10	8

$3x(x - \frac{14}{8})(x + \frac{4}{8})$

$3x(x - 7/4)(x + 1/2)$

Factored Form: $3x(4x-7)(2x+1)$

Solution: $x = 0, 7/4, -1/2$

56
1, 56
2, 28
4, 14
7, 8

Solve equation by Completing the Square

6. $3x^2 - 15 = 12x$ $\quad \frac{3x^2}{3} - \frac{12x}{3} - \frac{15}{3} = 0$

$x^2 - 4x - 5 = 0$

$x^2 - 4x + \frac{4}{} = +5 + \frac{4}{}$

$(\frac{b}{2})^2 = (\frac{-4}{2})^2 = (-2)^2 = 4$

$(x-2)(x-2) = 9$

$(x-2)^2 = 9$

$x - 2 = \pm\sqrt{9}$

$x = 2 \pm 3$ $\quad \boxed{x = 5, -1}$

7. a) Solve equation by quadratic formula
b) Find the discriminant
c) Based on the discriminant, find the number and the type of solutions

$a = -2$
$b = 4$
$c = -9$

$4x - 2x^2 = 9$ $\quad -2x^2 + 4x - 9 = 0$

$\frac{-4 \pm \sqrt{(4)^2 - 4(-2)(-9)}}{2(-2)} = \frac{-4 \pm \sqrt{-56}}{-4}$

$\frac{-4 \pm 2i\sqrt{14}}{-4} = \frac{-4}{-4} \pm \frac{2i\sqrt{14}}{4}$

$\boxed{1 \pm \frac{i\sqrt{14}}{2}}$

8. A diver dives off a cliff that is 50 meters high. His coach waits on a ridge that is 30 meters above the water to take the diver's picture. How much time (to the nearest second) has elapsed when the diver is at the same level (height above water) as the coach? **HINT:** $h = -4.9t^2 + h_0$ where h_0 is the initial height in meters and t is number of seconds elapsed.

Create quadratic equation

$x = 2, x = -1/2$

$(x-2)(x+1/2)$

$(x-2)(2x+1)$

Standard form: $2x^2 + x - 4x - 2$

$\boxed{2x^2 - 3x - 2}$