Solve equation by factoring

1. $48x^3 = 9x + 6x^2$

Solve equation by Completing the Square

2. $16 + 4x^2 = 32x$

Factored Form: _____

Solution: _____

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

    $3 - 4x^2 = 7x$

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

    $4x^2 + 12x^3 = 12x$

Solve equation by factoring

5. $20x^4 - 60x^2 - 65x^3 = 0$

Factored Form: _____

Solution: _____

Solve equation by Completing the Square

6. $2x^2 + 10 = 16x$

7. a) Solve equation by quadratic formula
    b) Find the discriminant
    c) Based on the discriminant, find the number
    and the type of solutions
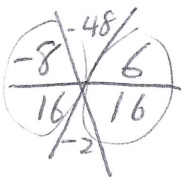
    $2x^2 + 7x = -9$

8. Create a quadratic function that has solutions at
    x = -3/4, and x = 2/3. Make sure that it is
    written in standard form $ax^2 + bx + c = 0$

CCGPS Analytic Geometry   Unit 5A Test Review #2

Solution Key

Solve equation by factoring

1. $48x^3 = 9x + 6x^2$ $48x^3 - 6x^2 - 9x = 0$

$3x(16x^2 - 2x - 3) = 0$

$3x(x - \frac{8}{16})(x + \frac{6}{16}) = 0$

$3x(x - \frac{1}{2})(x + \frac{3}{8}) = 0$

$3x(2x - 1)(8x + 3)$

$\frac{-8 \times 6}{16 \times 16}$ -48 -2

Factored Form: $\underline{3x(8x+3)(2x-1)}$

Solution: $\underline{x = 0, \frac{-3}{8}, \frac{+1}{2}}$

Solve equation by Completing the Square

2. $16 + 4x^2 = 32x$

$\frac{4x^2}{4} - \frac{32x}{4} + \frac{16}{4} = 0$

$x^2 - 8x + 4 = 0$ $x^2 - 8x + \underline{16} = -4 + \underline{16}$

$(\frac{6}{2})^2 = (\frac{-8}{2})^2 = (-4)^2 = 16$ $(x-4)(x-4) = 12$

$(x-4)^2 = 12$

$\sqrt{(x-4)^2} = \pm\sqrt{12}$

$x - 4 = \pm 2\sqrt{3}$

$\boxed{x = 4 \pm 2\sqrt{3}}$

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

$3 - 4x^2 = 7x$ $4x^2 + 7x - 3 = 0$

$a = 4$
$b = 7$
$c = -3$

$\dfrac{-7 \pm \sqrt{(7)^2 - 4(4)(-3)}}{2(4)}$

$\dfrac{-7 \pm \sqrt{97}}{8} = \boxed{\dfrac{-7}{8} \pm \dfrac{\sqrt{97}}{8}}$

Discriminant $= 97 > 0$

2 Real solutions

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

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

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

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

$\dfrac{-1 \pm \sqrt{1^2 - 4(3)(-3)}}{2(3)}$

$\boxed{\dfrac{-1 \pm \sqrt{37}}{6}}$

$x = \dfrac{-1}{6} \pm \dfrac{\sqrt{37}}{6}$

Discriminant $= 37 > 0$

2 Real Roots

Solve equation by factoring

5. $20x^4 - 60x^2 - 65x^3 = 0$

$$20x^4 - 65x^3 - 60x^2 = 0$$
$$5x^2(4x^2 - 13x - 12) = 0$$

$$
\begin{array}{c}
-48 \\
-16 \diagdown \quad 3 \\
4 \diagup \diagdown 4 \\
-13
\end{array}
$$

1, 48
2, 24
③, 16
4, 12
6, 8

$$5x^2\left(x - \tfrac{16}{4}\right)\left(x + \tfrac{3}{4}\right)$$
$$5x^2(x - 4)(4x + 3)$$

Factored Form: $\underline{5x^2(x-4)(4x+3)}$

Solution: $\underline{X = 0, 4, -3/4}$

Solve equation by Completing the Square

6. $2x^2 + 10 = 16x$ $\quad \dfrac{2x^2 - 16x + 10}{2} = \dfrac{0}{2}$

$$x^2 - 8x + 5 = 0$$
$$x^2 - 8x + \underline{16} = -5 + \underline{16}$$
$$\left(\tfrac{b}{2}\right)^2 = \left(\tfrac{-8}{2}\right)^2 = (4)^2 = 16$$
$$(x - 4)^2 = 11$$
$$\sqrt{(x-4)^2} = \pm\sqrt{11}$$
$$x - 4 = \pm\sqrt{11}$$
$$\boxed{X = 4 \pm \sqrt{11}}$$

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

$2x^2 + 7x = 9$ $\quad 2x^2 + 7x + 9 = 0$

$$\frac{-7 \pm \sqrt{49 - 4(2)(+9)}}{2(2)}$$

$$\frac{-7 \pm \sqrt{-23}}{4} = \frac{-7 \pm i\sqrt{23}}{4}$$

$$\boxed{X = \frac{-7}{4} \pm \frac{i\sqrt{23}}{4}}$$

$$D = -23 < 0$$
$$2 \text{ imaginary Roots}$$

8. Create a quadratic function that has solutions at $x = -3/4$, and $x = 2/3$. Make sure that it is written in standard form $ax^2 + bx + c = 0$

$$\left(x + \tfrac{3}{4}\right)\left(x - \tfrac{2}{3}\right)$$

$$(4x + 3)(3x - 2)$$

$$12x^2 - 8x + 9x - 6$$

$$\boxed{12x^2 + 1x - 6}$$