Morning Factoring Test Review #4 **Wed Sept 23, 2015**

Solve by Factoring #1-2

1. $6x^2 = 27 + 21x$

Factored Form: _____

Solution: _____

2. $18x^2 = 32$

Factored Form: _____

Solution: _____

Solve by completing the square method

3. $4x^2 = 15x + 16 + 9x$

Solution: _____

Solve by completing the square method

4. $2x^2 = 20x + 8$

Solution: _____

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

Use discriminant to find the below

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

Discriminant_____

Nature of solution: _____

Use quadratic equation and discriminant to solve:

6. $5x^2 - 2 - x = 5x + 9$

Solution: _____

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Key

Solve by Factoring #1-2

1. $6x^2 = 27 + 21x$

$6x^2 - 21x - 27 = 0$

$-9 \times 2 = -18$

$-9 + 2 = -7$

$3(2x^2 - 7x - 9) = 0$

$2x^2 - 9x + 2x - 9$

$x(2x-9) + 1(2x-9)$

Factored Form: $3(x+1)(2x-9)$

Solution: $x = -1, 9/2$

2. $18x^2 = 32$

$18x^2 - 32 = 0$

$2(9x^2 - 16) = 0$

$2(9x^2 + 0x - 16) = 0$

$12 \times -12 = -144$

$12 + -12 = 0$

$9x^2 + 12x - 12x - 16$

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

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

Solution: $x = -4/3, 4/3$

Solve by completing the square method

3. $4x^2 = 15x + 16 + 9x$

$\frac{4x^2}{4} - \frac{24x}{4} - \frac{16}{4} = \frac{0}{4}$

$\left(\frac{b}{2}\right)^2 = \left(\frac{-6}{2}\right)^2 = 3^2 = 9$

$x^2 - 6x - 4 = 0$

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

$(x-3)^2 = 13$

$\sqrt{(x-3)^2} = \pm\sqrt{13}$

$x - 3 = \pm\sqrt{13}$

$x = 3 \pm \sqrt{13}$

Solution: $x = 3 \pm \sqrt{13}$

Solve by completing the square method

4. $2x^2 = 20x + 8$

$\frac{2x^2}{2} - \frac{20x}{2} - \frac{8}{2} = \frac{0}{2}$

$\left(\frac{b}{2}\right)^2 = \left(\frac{10}{2}\right)^2 = 5^2 = 25$

$x^2 - 10x - 4 = 0$

$x^2 - 10x + 25 = 4 + 25$

$(x-5)^2 = 29$

$\sqrt{(x-5)^2} = \pm\sqrt{29}$

$x - 5 = \pm\sqrt{29}$

$x = 5 \pm \sqrt{29}$

Solution: $x = 5 \pm \sqrt{29}$

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

Use discriminant to find the below

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

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

$a = 1$

$b = -6$

$c = 9$

$b^2 - 4ac$

$6^2 - (4 \cdot 1 \cdot 9)$

$36 - 36 = 0$

Discriminant: 0

Nature of solution: 1 Real

Use quadratic equation and discriminant to solve:

6. $5x^2 - 2 - x = 5x + 9$

$5x^2 - 2 - x - 5x - 9$

$5x^2 - 6x - 11 = 0$

$a = 5$

$b = -6$

$c = -11$

$b^2 - 4ac$

$36 - (4 \cdot 5 \cdot -11) = 256$

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

$x = \dfrac{6 \pm \sqrt{256}}{2(5)}$

Solution: $\dfrac{6 \pm \sqrt{256}}{10}$

Geometry Concept Review for Solving by Factoring, Completing the Square, and Quadratic Formula

I. Solving by Factoring method

1. Arrange terms in standard form : $ax^2 + bx + c = 0$
2. Factor out GCF

* If equation is missing a "b" value, then add in 0x (example: $4x^2 - 9 = 0$ becomes $4x^2 + 0x - 9 = 0$)

3. Find values where

$$\_\_\_\_ \times \_\_\_\_ = a \times c$$
$$\_\_\_\_ + \_\_\_\_ = b$$

4. Replace "b" term with values from above
5. Pair terms and factor out GCF for each pair
6. Put expression in factored form
7. Solve for each x.

II. Solving by Completing the Square method

1. Arrange terms in standard form : $ax^2 + bx + c = 0$
2. "a" value MUST be equal to 1, so divide each term by the GCF to make a = 1
3. Move constant to the other side of the equation and add spaces to each side

$x^2 + bx + \_\_\_ = c + \_\_\_$

4. Find $\left(\frac{b}{2}\right)^2$ and enter this value into the blank spaces ___ on both sides of the equation
5. Rewrite left side in factored form and add the numbers on the right side
6. take the $\sqrt{\ }$ of both sides (don't forget $\pm$)
7. solve for x

III. Solving by Quadratic Formula method

1. Arrange terms in standard form : $ax^2 + bx + c = 0$
2. Find the discriminant : $b^2 - (4 \times a \times c)$
3. Plug into quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
4. Solve for x

IV. The Discriminant

1. The discriminant describes the **nature** , or the type, of solutions
2. If the Discriminant is **positive (D > 0)** , there are 2 real answers (2 real roots)
3. If the Discriminant is **zero,(D = 0)** there is 1 real answer. (1 real root)
4. If the Discriminant is **negative (D< 0)** , there are 2 imaginary answers (2 imaginary roots)

no or Real