Name:_____ Date:_____

Pre-Calculus 11 Ch3/4 HW Lesson1 Factoring Trinomials

1. Given each pair of binomials, expand and simplify:

a. $(x-3)(x+4)$ b. $(x+11)(x-9)$ c. $(2x+3)(3x-1)$

e. $(7x-3)(4x+2)$ f. $(10x-3)(4x-2)$ g. $(8x-3)(3x-8)$

2. Given each expression, find the missing value in the box:

a. $x^2-11x-12=(x-\boxed{?})(x+1)$ b. $x^2-29x+120=(x-\boxed{?})(x-5)$

c. $5x^2+6x+1=(5x+\boxed{?})(x+1)$ d. $2x^2-23x+11=(2x-\boxed{?})(x-11)$

3. Factor each of the following expressions. Show all your steps and work:

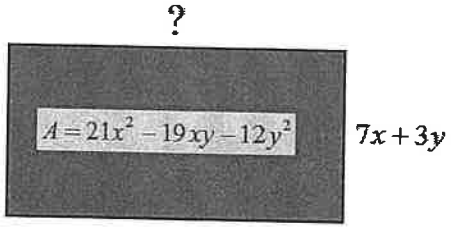
a. x^2+7x+6 b. $x^2+25x+24$ c. $x^2+10x+21$ d. $x^2-10x+24$

e. $x^2+3x-40$ f. $4x^2+9x+2$ g. $2x^2+5x+2$ h. $2x^2-11x+15$

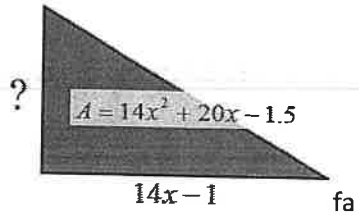
i) $21x^2+17x-30$ j) $2x^2-7x+5$ k) $5x^2-13x-6$ L) $7x^2+9x-10$

m) $21+26x-15x^2$ n) $2x^2-9xy-45y^2$ o) $5x^4-9x^2-2$ p) $6-7x^2+2x^4$

4. The area of a rectangle is given by the expression: $21x^2-19xy-12y^2$ and the width is $7x+3y$. Find the length of the rectangle:



5. The area of a triangle is given by the expression: $14x^2+20x-1.5$ and the width is $14x-1$. Find the length of the rectangle:



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Name:_____ Date:_____

Pre-Calculus 11 Ch3/4 HW Lesson2 Solving Quadratic Equations by Factoring

1. Given each pair of binomials, solve for "x":

a. $(x+9)(x+21)=0$ b. $4(x-3)(x+3)=0$ c. $(x+81)(x-29)=0$

e. $(2x-5)\left(x-\frac{1}{2}\right)=0$ f. $x(3x+1)=0$ g. $2(5-2x)\left(\frac{1}{3}-x\right)=0$

2. Factor each of the following expressions and solve for "x". Show all your steps and work:

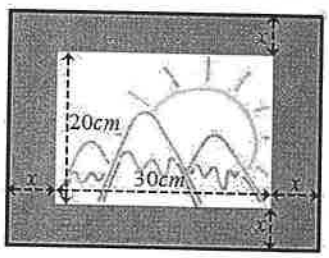
a. $x^2+8x+12=0$ b. $x^2+17x+72=0$ c. $x^2+2x-15=0$ d. $x^2-7x-170=0$

e. $x^2-64=0$ f. $100-x^2=0$ g. $(2x-1)^2-16=0$ h. $2x^2-11x+15=0$

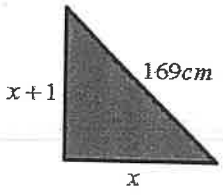
i) $13x^2+8x-5=0$ j) $2x^2-25x-13=0$ k) $2x^2-7x+6=0$ L) $10x^2+49x+49=0$

m) $(x+2)^2+8(x+2)-20=0$	n) $(x-3)^2+10(x-3)+9=0$	o) $2(x+1)^2-(x+1)-6=0$
p) $4(x+2)^2=6-5(x+2)$	o) $x^4-256=0$	q) $x^4=10-9x^2$
r) $r^4-17r^2+16=0$	s) $x^4-29x^2+100=0$	t) $4(x^2-6x+9)^2-12(x^2-6x+9)=-9$

3. A photograph that is 20cm by 30cm is framed with a uniform mat board as shown below. If the area of the photo with the mat is 999cm^2, then what is the width of the mat?



4. Find the length of the base for the following triangle:



Name:_____ Date:_____

Pre-Calculus 11 Ch3/4 HW Lesson 8: Solving Quadratic Equations by CTS

1. When solving the equation $9 = x^2$, how many solutions will there be? Explain:

2. When Solving the equation $12 = (x-3)^2$, how many solutions will there be? What are they?

3. What are we looking for on a graph when solving for "x"?

4. Suppose we solve for "x" and there is only one answer. What does this mean?

5. Solve each of the following equations algebraically:

a) $(x-3)^2 - 12 = 0$	b) $(2x+4)^2 - 16 = 0$	c) $-4(x+7)^2 + 14 = 0$
d) $0.5(x+11)^2 - 11 = 0$	e) $(x+5)^2 + 12 = 0$	f) $\frac{(2x+1)^2}{3} - 15 = 0$

g) $-\frac{2}{3}\left(x-\frac{3}{2}\right)^2+4=0$	h) $-\frac{7}{3}(2x-13)^2+15=0$	i) $\frac{17}{3}(2x-21)^2=0$

6. Solve each of the following quadratic equations by Completing the Square. Please show all your steps:

a) $0=3x^2+8x-5$	b) $0=4x^2+12x-11$
c) $4x^2=2-13x$	d) $0=-5x^2+10x-3$

7. The equation of a parabola is given by the equation: $y = 3x^2 + 5x - 10$. Find the roots [aka: coordinates of the x-intercepts] by completing the square:

8. A rocket is shot into the sky and the height of the rocket is given by the equation: $h(t) = -5t^2 + 12t + 10$ where "t" is the number of seconds after the rocket was launched.
   a. What is the height when the rocket hits the ground?

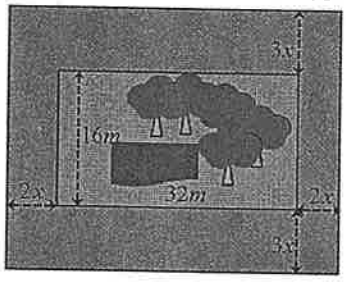
   b. At what time does the rocket hit the ground?

   c. After how many seconds will the rocket be at a height of 30meters?

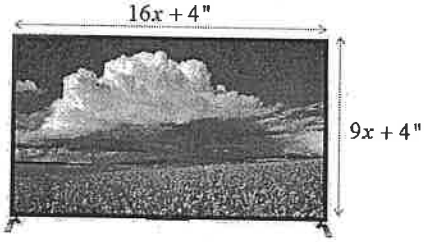
9. The sum of an arithmetic series is given by the equation: $S = \frac{n}{2}(2 \times a + [n-1]d)$, where "n" is the number of terms, "a" is the first term, and "d" is the common difference. If the first term *"a"* is 10, common difference *"d"* is 4, and the sum *"S"* is 1144, find the number of terms *"n"* in the series.

10. On desmos, the formula for a perfect basketball shot is given by the formula: $h(x) = -0.05x^2 + 1.2x + 5.6$, where "h" is the height of the ball and "x" is the distance from the shooter. How far is the ball from the shooter when the height of the ball is 11feet high?
https://www.desmos.com/calculator/djikpphgde

11. A rectangular playground (16m by 32m) has a walkway around it as shown below. If adding the walkway doubles the area of the playground, find the value of "x":



12. Jason bought a 75" television at Costco. He knows that the screen aspect ratio is 16:9 [width to height]. Besides the screen, there is also a uniform border of 2" around. What is the width of the TV?



Name:_____ Date:_____

Pre-Calculus 11 CH3/4 HW Lesson 5: The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad , \quad a \neq 0$$

1. Given each quadratic equation, indicate the values of the coefficients "a", "b" and "c":

a) $x^2 + 5x + 6 = 0$ $a =$ _____ $b =$ _____ $c =$ _____	b) $12x^2 + 7x - 3 = 0$ $a =$ _____ $b =$ _____ $c =$ _____	c) $-2x^2 - 7x + 5 = 0$ $a =$ _____ $b =$ _____ $c =$ _____
d) $4x^2 = 13x - 8$ $a =$ _____ $b =$ _____ $c =$ _____	e) $x(7 - 8x) = 10$ $a =$ _____ $b =$ _____ $c =$ _____	f) $x(x+2) = 6 - (x-3)(2x+1)$ $a =$ _____ $b =$ _____ $c =$ _____

2. Solve for "x" for each of the following by using the quadratic formula:

a) $x^2 - 5x + 6 = 0$	b) $3x^2 - x + 1 = 3$	c) $2x^2 - 3x - 1 = 0$
d) $-0.5x^2 + 4x + 12 = 0$	e) $-0.5x^2 + 3x = 6$	f) $-3x^2 = 12x - 5$

g) $3x(2x-6)=8$	h) $\frac{4x^2}{3}=4x-2$	i) $x^2-2=\frac{-7x}{2}$
j) $2x^3-5x^2+7x=0$	k) $2x^2+6x-8=7x^2-2x$	L) $2(2x-1)^2+9(2x-1)+7=0$

3. Under what conditions will the equation have no solutions? $ax^2+bx+c=0$ Explain why

4. Under what conditions will the equation have only one solution? $ax^2+bx+c=0$ Explain why

5. The revenue a company makes for selling shoes is given by the equation: $R=-8p^2+1200p$, where "*R*" is the revenue and '*p*" is the price in dollars. At what price should the company sell their shoes to generate a revenue of $400,000?

6. Here are the steps that John used to solve the equation: $12x^2-7x-3=0$. Find the mistakes:

$L_1: x=-7\pm\frac{\sqrt{49^2-4(12)(3)}}{2(12)}$

$L_2: x=-7\pm\frac{\sqrt{2401-144}}{24}$

$L_3: x=-7\pm\frac{\sqrt{2257}}{24}$

$L_4: x=-7\pm1.9794955..$

$L_5: x_1=-7+1.9794955..=-5.0205...$

$L_6: x_2=-7-1.9794955..=-8.9794955...$

Name:_____ Date:_____

Pre-Calculus 11 Ch3/4 HW Lesson 9 Discriminant Nature of the Roots $D = b^2 - 4ac$

1. Determine the nature of the roots [ie: Determine how many x-intercepts each quadratic equation has]

a) $x^2 + 5x + 6 = 0$	b) $2x^2 + 7x - 3 = 0$	c) $-2x^2 - 7x + 5 = 0$
d) $4x^2 = 13x - 8$	e) $x(7 - 8x) = 10$	f) $x(x+2) = 6 - (x-3)(2x+1)$

2. Solve each of the following inequalities:

a) $x^2 < 16$	b) $x^2 - 25 > 0$	c) $x(3-x) < 0$

3. Determine the value of "k" so that the equation has two equal roots:

a) $x^2 + kx + 25 = 0$	b) $kx^2 + 4x + 1 = 0$	c) $0.5x^2 + 3kx + (3k+4) = 0$

4. Determine the value of "k" so that the equation has two different roots:

a) $x^2 - kx + 12 = 0$	b) $kx^2 - kx + 1 = 0$	c) $x^2 - 4kx + (5k - 6) = 0$

5. Determine the value of "k" so that the equation has no real roots:

a) $x^2 - kx - 24 = 0$	b) $kx^2 - kx + 8 = 0$	c) $x^2 - 3kx - (3k - 8) = 0$

6. In order for a quadratic function to be factorable, what value must the discriminant be equal to? Explain:

7. If the quadratic equation $(x-2)^2 + k = 0$ has two distinct real roots, then what is the range of "k"? (Multiple choice, circle one) Justify your answer.

a) $k > 2$ b) $k < 0$ c) $k \leq 0$ d) $k \leq 4$