Geometry Fall Final Exam Review #2

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: _____

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

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

$4x^2 - 24x - 16 = 0$

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

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

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

$(x-3)^2 = 13$

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

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

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

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

Solve by completing the square method

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

$2x^2 - 20x - 8 = 0$

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

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

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

$(x-5)^2 = 29$

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

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

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

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

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

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

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

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

$a = 5$

$b = -6$

$c = -11$

$b^2 - 4ac$

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

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

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

$\frac{6 \pm \sqrt{256}}{10}$

Solution:

7) $y = x^2 - 4x - 12$

Form: _____ a = _____ Opens: _____

Vertex: _____ AOS: _____

x-int: _____ y-int: _____

Domain: _____ Range: _____

End Behavior: As $x \to \infty, f(x) \to$ _____

As $x \to -\infty, f(x) \to$ _____

Interval of Increase: _____

Interval of Decrease: _____

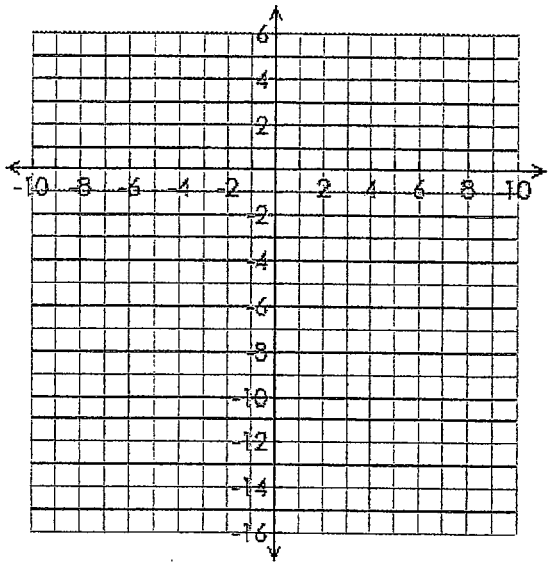
Interval(s) of Positive: _____

Interval(s) of Negative: _____

Min: _____

Max: _____

Average Rate of Change from [4, 6] = _____



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

Form: _____ a = _____ Opens: _____

Vertex: _____ AOS: _____

x-int: _____ y-int: _____

Domain: _____ Range: _____

End Behavior: As $x \to \infty, f(x) \to$ _____

As $x \to -\infty, f(x) \to$ _____

Interval of Increase: _____

Interval of Decrease: _____

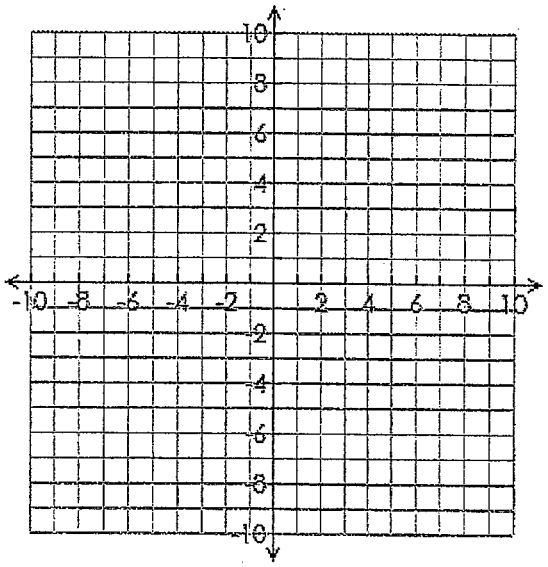
Interval(s) of Positive: _____

Interval(s) of Negative: _____

Min: _____

Max: _____

Average Rate of Change from [-4, 0] = _____



9) $y = -(x-4)^2 + 16$

Form: _____ a = _____ Opens: _____

Vertex: _____ AOS: _____

x-int: _____ y-int: _____

Domain: _____ Range: _____

End Behavior: As $x \to \infty, f(x) \to$ _____

As $x \to -\infty, f(x) \to$ _____

Interval of Increase: _____

Interval of Decrease: _____

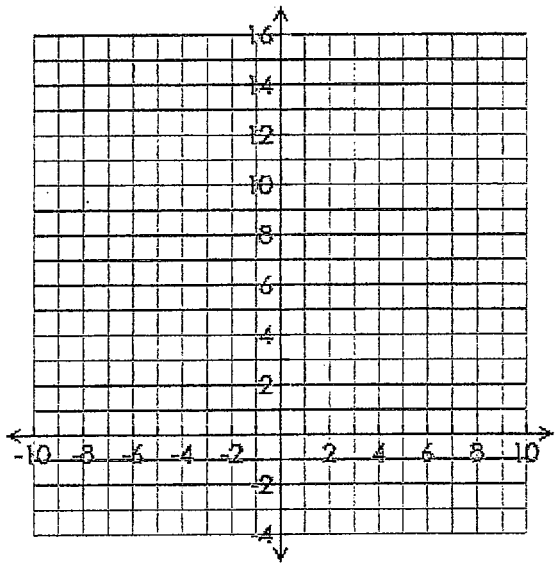
Interval(s) of Positive: _____

Interval(s) of Negative: _____

Min: _____

Max: _____

Average Rate of Change from [0, 2] = _____



10) $y = -x^2 - 10x - 21$

Form: _____ a = _____ Opens: _____

Vertex: _____ AOS: _____

x-int: _____ y-int: _____

Domain: _____ Range: _____

End Behavior: As $x \to \infty, f(x) \to$ _____

As $x \to -\infty, f(x) \to$ _____

Interval of Increase: _____

Interval of Decrease: _____

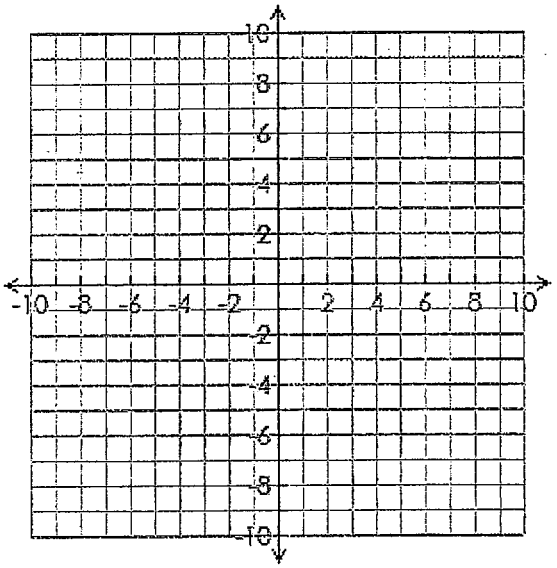
Interval(s) of Positive: _____

Interval(s) of Negative: _____

Min: _____

Max: _____

Average Rate of Change from [-6, -2] = _____



Analytic Geometry Unit 5B Practice

Key

7. $y = x^2 - 4x - 12$ $x = \frac{-b}{2a} = \frac{+4}{2(1)} = 2$

Form: standard a = 1 Opens: up

Vertex: (2, -16) AOS: $x = 2$

x-int: (-2, 0), (6, 0) y-int: (0, -12)

Domain: $(-\infty, \infty)$ Range: $[-16, \infty)$

End Behavior: As $x \to \infty$, $f(x) \to +\infty$

As $x \to -\infty$, $f(x) \to +\infty$

Interval of Increase: $(2, \infty)$

Interval of Decrease: $(-\infty, 2)$

Interval(s) of Positive: $(-\infty, -2) \cup (6, \infty)$

Interval(s) of Negative: $(-2, 6)$

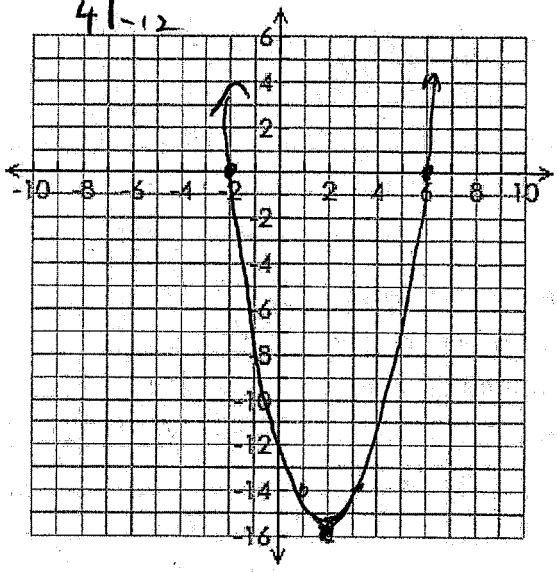
Min: (2, -16) or -16

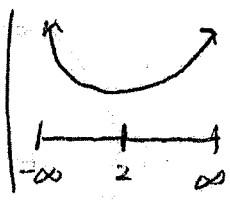
Max: none

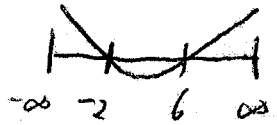
Average Rate of Change from [4, 6] = 6

(4, -12) (6, 0) $\frac{-12-0}{4-6} = \frac{-12}{-2} = 6$

x	y
0	-12
1	-15
2	-16
3	-15
4	-12







8. $y = 2(x + 3)(x - 1)$

Form: intercept / factored a = 2 Opens: up

Vertex: (-1, -8) AOS: $x = -1$

x-int: (-3, 0) (1, 0) y-int: (0, -6)

Domain: $(-\infty, \infty)$ Range: $[-8, \infty)$

End Behavior: As $x \to \infty$, $f(x) \to +\infty$

As $x \to -\infty$, $f(x) \to +\infty$

Interval of Increase: $(-1, \infty)$

Interval of Decrease: $(-\infty, -1)$

Interval(s) of Positive: $(-\infty, -3) \cup (1, \infty)$

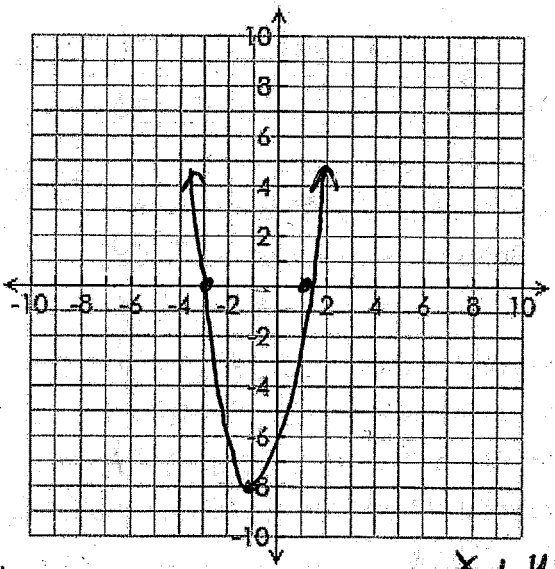
Interval(s) of Negative: $(-3, 1)$

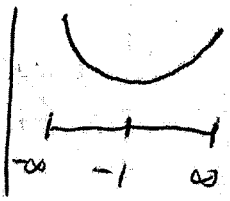
Min: (-1, -8) or -8

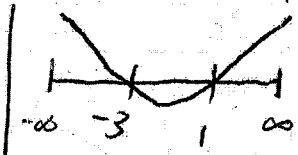
Max: none

Average Rate of Change from [-4, 0] = -1

(-4, 10) (0, -6) $\frac{10-6}{-4-0} = \frac{4}{-4}$







x	y
-3	0
-2	-6
-1	-8
0	-6
1	0

Analytic Geometry Unit 5B Practice

9. $y = -(x-4)^2 + 16$

Form: vertex a = -1 Opens: down

Vertex: (4,16) AOS: $x = 4$

x-int: (0,0) (8,0) y-int: (0,0)

Domain: $(-\infty, \infty)$ Range: $(-\infty, 16]$

End Behavior: As $x \to \infty, f(x) \to -\infty$

As $x \to -\infty, f(x) \to -\infty$

Interval of Increase: $(-\infty, 4)$

Interval of Decrease: $(4, \infty)$

Interval(s) of Positive: $(0, 8)$

Interval(s) of Negative: $(-\infty, 0) \cup (8, \infty)$

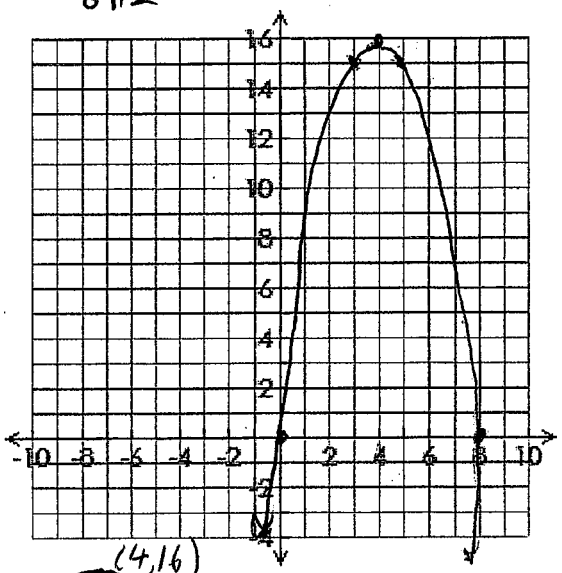
Min: none

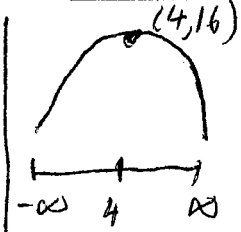
Max: (4,16) or 16

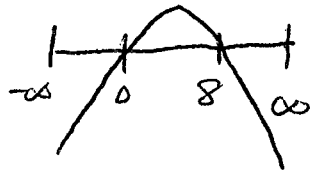
Average Rate of Change from [0, 2] = 6

(0,0) (2,12) $\frac{12-0}{2-0} = 6$

x	y
2	12
3	15
4	16
5	15
6	12







$x = \frac{-b}{2a} = \frac{10}{2(-1)} = -5$

10. $y = -x^2 - 10x - 21$

Form: standard a = -1 Opens: down

Vertex: (-5, 4) AOS: $x = -5$

x-int: y-int:

Domain: $(-\infty, \infty)$ Range: $(-\infty, -5]$

End Behavior: As $x \to \infty, f(x) \to -\infty$

As $x \to -\infty, f(x) \to -\infty$

Interval of Increase: $(-\infty, -5)$

Interval of Decrease: $(-5, \infty)$

Interval(s) of Positive: $(-7, -3)$

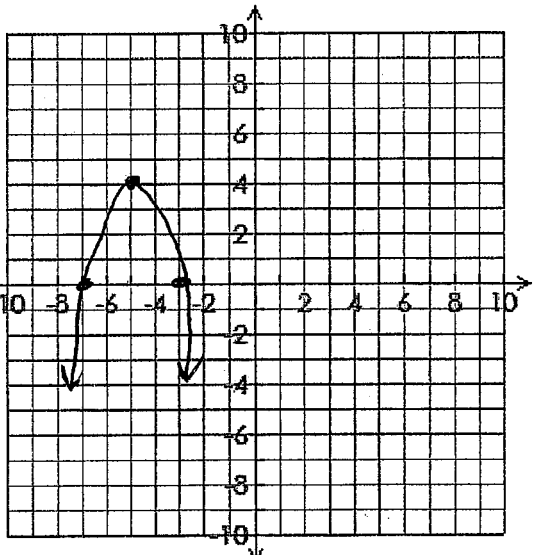
Interval(s) of Negative: $(-\infty, -7) \cup (-3, \infty)$

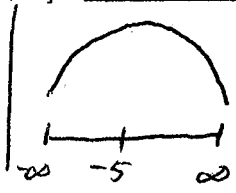
Min: none

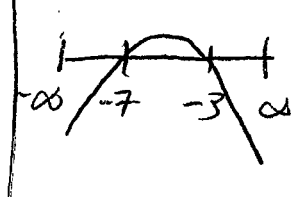
Max: (-5, 4) or 4

Average Rate of Change from [-6, -2] = -2

(-6, 3) (-2, -5) $\frac{3+5}{-6+2} = \frac{8}{-4} = -2$







x	y
-7	0
-6	3
-5	4
-4	3
-3	0

Geometry Special Right Triangle Formula Review

11) Pythagorean Theorem _____

12) Pythagorean Triple: All sides of a right triangle are _____

13) Acute, Right, Obtuse: Classifying triangles

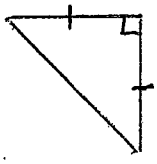
Acute _____

Right _____

Obtuse _____

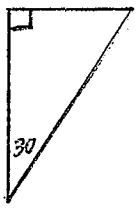
14) 45-45-90 Triangles (Fill in rest of diagram)

leg leg hypotenuse



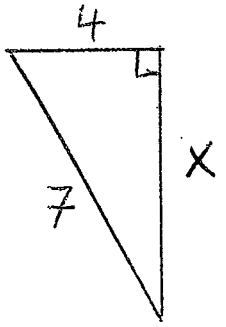
15) 30-60-90 Triangles (Fill in rest of diagram)

long short hypotenuse



Review Questions

16) Find missing side



x = _____

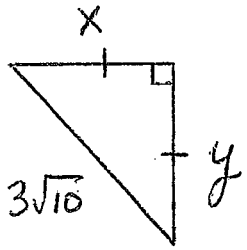
17) Determine if triangle is acute, right, or obtuse.

4, 5, 7

Justify Answer

_____

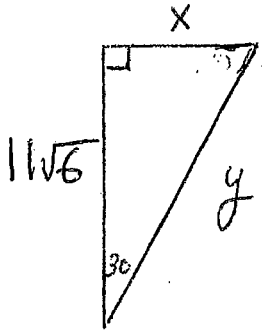
18) Find x and y



x = _____

y = _____

19) Find x and y



x = _____

y = _____

KEY

Quiz

Geometry Special Right Triangle Formula Review

1) Pythagorean Theorem $a^2+b^2=c^2$

2) Pythagorean Triple: All sides of a right triangle are Whole numbers

3) Acute, Right, Obtuse: Classifying triangles

Acute $c^2 < a^2+b^2$

Right $c^2 = a^2+b^2$

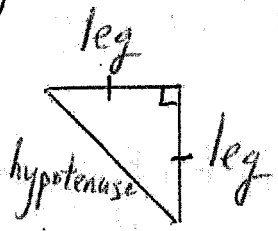
Obtuse $c^2 > a^2+b^2$

4) 45-45-90 Triangles (Fill in rest of diagram)

leg = leg hypotenuse

$\times\sqrt{2}$ (leg → hypotenuse)

$\div\sqrt{2}$ (hypotenuse → leg)



5) 30-60-90 Triangles (Fill in rest of diagram)

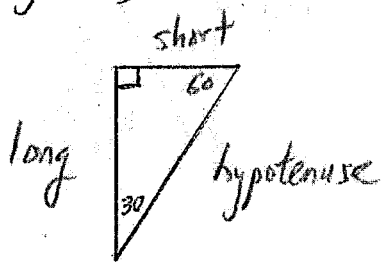
long — short — hypotenuse

$\div\sqrt{3}$ (long → short)

$\times 2$ (short → hypotenuse)

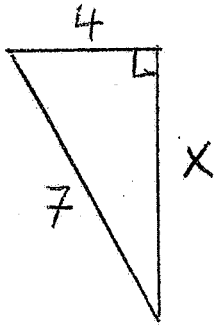
$\times\sqrt{3}$ (short → long)

$\div 2$ (hypotenuse → short)



Review Questions

6) Find missing side



$4^2 + x^2 = 7^2$

$x^2 = 7^2 - 4^2$

$x^2 = 49 - 16$

$x^2 = 33$

$x = \sqrt{33}$

$x = \sqrt{33}$

7) Determine if triangle is acute, right, or obtuse.

Justify Answer

4, 5, 7 $\quad 7^2 \quad 4^2 + 5^2$

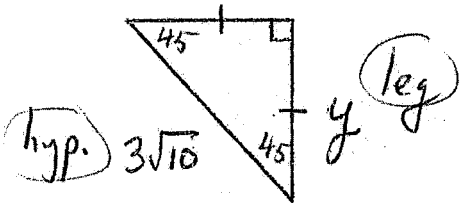
$49 \quad 16 + 25$

$49 > 41$

obtuse triangle

since $c^2 > a^2 + b^2$

8) Find x and y



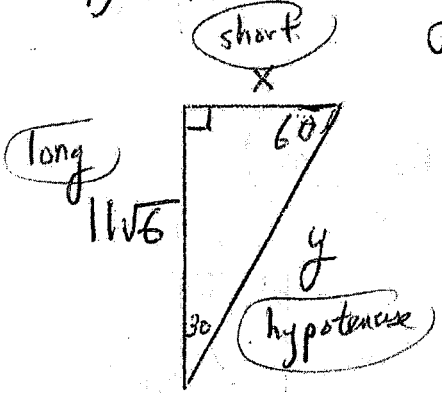
$x = \frac{3\sqrt{10}}{\sqrt{2}} = 3\sqrt{5}$

leg = leg hypotenuse (leg = leg $\times\sqrt{2}$ hypotenuse; hypotenuse $\div\sqrt{2}$ leg)

$x = 3\sqrt{5}$

$y = 3\sqrt{5}$

9) Find x and y



$x = \frac{11\sqrt{6}}{\sqrt{3}} = 11\sqrt{2}$

$y = 11\sqrt{2} \cdot 2 = 22\sqrt{2}$

long $\div\sqrt{3}$ short $\times 2$ hypotenuse

long $\times\sqrt{3}$ short $\div 2$ hypotenuse

$x = 11\sqrt{2}$

$y = 22\sqrt{2}$