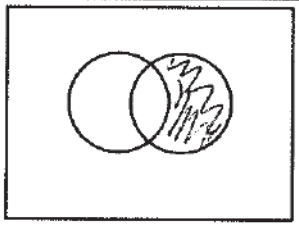
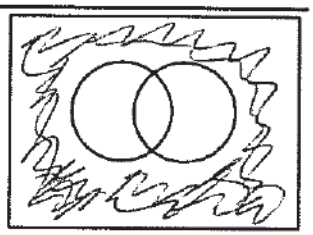
Name: Key Date: 12/18/2015 Algebra II – Semester Test

1) Shade in the following Venn diagrams for the names given.

(2) a) $A' \cap B$ b) $A' \cap B'$





2) a) When dealing with radicals, we do not want a $\sqrt{}$ in the denominator and a $\perp$ in the radical. (Do NOT think of domain.)

(5) b) When dividing with the same base, you keep the base and ~~add~~ subtract the exponents.

c) When writing a number in scientific notation, there should be 1 digit/s before the decimal.

d) When multiplying with the same base, you keep the base and add the exponents.

3) Matching! Write the letter next the bracket that matches its description.

(3)

E Square Brackets	A) Brackets to hold your braces together
C Curly Brackets	B) Used in interval notation which means to exclude the endpoint
A Dental Brackets	C) Used in set notation to represent a set
B Round Brackets	D) Used in your house to hold a piece of wood to the wall
D Shelf Brackets	E) Used in interval notation which means to include the endpoint

4) Classify the following polynomials by their degree and number of terms.

(6) a) $7 + x^2$ quadratic binomial b) $x^3 + 3x$ cubic binomial c) $x + 6^4$ linear binomial d) 2^4 constant monomial

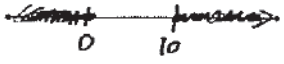
5) Identify the independent and dependent variables in the following scenarios.

(3) a) The more questions I put on a test, the more problems you get wrong.

b) There are fewer seats to sit in as students come to class.

6) Write an **absolute value inequality** to represent the following:

(2) a) $|x-5| \geq 5$.



7) Put the following polynomials in standard form and identify the leading coefficient.

(2) a) $9x^7 + 3x^4 - 8x^9$ (-8) b) $6x^2 - x^3 + 8^5 - 3x^4 + 2x^{10}$ (2)

$-8x^9 + 9x^7 + 3x^4$,

8) For each of the following, identify the parent function and describe the transformations done to it.

(3)

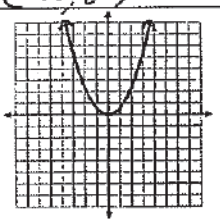
Functions	Parent Function	Transformations
a) $f(x) = -(x+2)^2$	$f(x) = x^2$	reflect x-axis, left 2.
b) $f(x) = \|x-1\| + 3$	$f(x) = \|x\|$	right 1, up 3.

(4) 9) What is the domain and range of the following graphs?

D

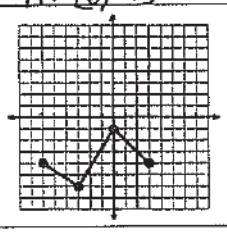
R: $[0, \infty)$
D: $(-\infty, \infty)$

a)



D: $[6, 3]$
R: $[6, -1]$

b)



(2) 10) Are the graphs from #2 functions?

a) yes b) yes.

Answers for:

(6) 11)

a) $x \leq \frac{11}{2}$, $(-\infty, \frac{11}{2}]$

b) $x > -\frac{22}{7}$ $(-\frac{22}{7}, \infty)$

(6) 12)

a) $x^2 y^3 \sqrt[4]{y}$

b) $2x^2 y^5 \sqrt[3]{4x^2}$

c) $2x^6 y \sqrt[5]{2xy^4}$

(3) 13)

a) $x + 220 \leq 500$

$x \leq 280$, $(-\infty, 280]$

b)

c) $[0, 280]$

(2) 14) All Reals.

(4) 15)

a) 2×10^{-17}

b) 1.85×10^{-3}

(6) 16)

a) $[-2, 5) \cup (5, \infty)$.

b) $(-\infty, \infty)$

(6) 17)

a) All Reals.

b) $(-\infty, \frac{-8}{9}] \cup [2, \infty)$.

(6) 18)

a) $4^{18} x^{\frac{46}{24}} y^{18}$

b) $\frac{1}{\sqrt[4]{5^5}}$

(6) 19)

a) $\frac{1}{3}\sqrt{3}$

b) $\frac{8\sqrt[4]{x}}{x}$

(6) 20)

a) $[2, 3)$

b) $(-\infty, -4) \cup (4, \infty)$.

(6) 21)

a) $x^3 + 2x^2 - 24x + 27$

b) $6x^4 - 5x + 3x^3 - 8x^2 + 10x + 7$

(6) 22)

a) $x^2 - 4x + 4$.

b) $-2x^3 + 2x^2 - 5x + 5$.

11) Solve the following inequalities and write your answers in interval notation.

a) $2x + 9 \leq 20$

b) $-2(7x + 15) \geq 14$ $\quad > -7$

12) Simplify the following radicals.

a) $\sqrt[4]{x^8y^{13}}$ b) $\sqrt[3]{32x^8y^{15}}$ c) $(64x^{31}y^9)^{\frac{1}{5}}$

13) This paper can only hold 500 words. I have already typed 220 words.

a) Write an inequality to represent this situation and solve it.

b) Write your answer in interval notation.

c) Write the interval that makes sense to you and EXPLAIN why you chose that interval.

14) Solve and graph the following inequality: $7 - y > 5 - y$

15) Simplify the following expressions. Write your answers in scientific notation.

a) $\frac{6*10^{-11}}{30*10^5}$

b) $2.5 * 10^5 * 7.4 * 10^{-9}$

16) Find the domain of the following functions:

a) $f(x) = \frac{5-x}{-50+10x} - \sqrt{3x+6}$ $\quad x \neq 5 \quad x \geq -2.$

b) $f(x) = x^3 + 4$

17) Solve the following inequalities, graph your answer, and write it in interval notation:

a) $|9x - 4| - 7 > -10$

b) $4|9x - 13| \geq 20$ $\quad |9x-13| \geq 5$ $\quad 9x \geq 18$ $\quad -9x+13 \geq 5$ $\quad x \geq 2.$ $\quad -9x \geq -8$ $\quad x \leq \frac{-8}{-9}$

18) Simplify the following expressions. Leave your answers in exponent form with positive exponents.

a) $(4^3x^9y^3 * x^2)^6$ $\quad 4^3 x^{11} y^3$

b) $\left(\frac{7^4}{7^8}\right)^{11}$

19) Rationalize/simplify the following radicals.

a) $\sqrt[2]{\frac{1}{3}}$

b) $\frac{8}{\sqrt[4]{x}}$

20) Solve the following compound inequalities, graph your solutions, and state them in interval notation.

a) $5 \leq 4b - 3 < 9$ $\quad +3 \quad +3 \quad +3$ $\quad 2 \leq b < 3$

b) $x + 2 < -2$ OR $x - 2 > 2$ $\quad -2 \quad +2$ $\quad x < -4$ or $x > 4$

21) Multiply the following polynomials.

a) $(x - 3)(x^2 + 5x - 9)$ b) $(2x + 1)(3x^3 - 4x + 7)$

22) Multiply the following polynomials.

a) $(x - 2)^2$ b) $(2x^2 + 5)(1 - x)$

	x^2	$5x$	-9
x	x^3	$5x^2$	$-9x$
-3	$-3x^2$	$-15x$	27

	$3x^3$	$-4x$	7
$2x$	$6x^4$	$-8x^2$	$14x$
1	$3x^3$	$-4x$	7

	$2x^2$	5
1	$2x^2$	5
$-x$	$-2x^3$	$-5x$

Name: Key
Algebra II – Test 4
1/28/2016

1) Factor the following polynomials.

a) $x^2 + 16x + 28$ $(x+2)(x+14)$

b) $x^2 + 3x - 10$ $(x-2)(x+5)$

c) $x^2 - 7x + 12$ $(x-3)(x-4)$

d) $x^2 + 11x + 10$ $(x+1)(x+10)$

(8)

2) Fill in the blanks for the steps to factor things completely

a) GCF
-Watching to make sure the first term is positive

b) Binomial
-Check for diff of 2 □ (special case)

c) Trinomial
-Best to use □ ◇ method.

(2)

3) What does it mean to factor something?

write as a product.

(1)

4) Factor each polynomial by grouping. * factor completely.

a) $6x^3 - 8x^2 + 25x - 40$ $2x^2(3x-4)+5(5x-8)$ $(2x^2+5)(5x-8)$

b) $x^3 - 4x - 16 + 4x^2$ $x(x^2-4)+4(x^2-4)$ $(x+4)(x^2-4)$ $(x+4)(x-2)(x+2)$

c) $2x^3 - x^2 - 3 + 6x$ $x^2(2x-1)+3(2x-1)=(2x-1)(x^2+3)$

d) $7x^3 + 2x^2 + 28x + 8$ $x^2(7x+2)+4(7x+2)$ $(7x+2)(x^2+4)$.

(8)

5) Match the description to the following general transformations.

D $f(x) \to f(x+5)$
I $f(x) \to f(5x)$
G $f(x) \to 5f(x)$
E $f(x) \to f(x)+5$
A $f(x) \to -f(x)$
B $f(x) \to f(-x)$
H $f(x) \to \frac{1}{5}f(x)$
I $f(x) \to f\left(\frac{1}{5}x\right)$

A) Reflection across x-axis
B) Reflection across y-axis
C) Right 5
D) Left 5
E) Up 5
F) Down 5
G) Vertical Stretch by 5
H) Vertical Compression by $\frac{1}{5}$
I) Horizontal Stretch by 5
J) Horizontal Compression by $\frac{1}{5}$

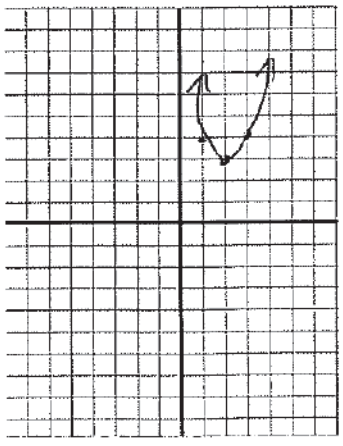
(4)

6) What is the prime factorization of the following numbers?

a) 164 $= 2^2 \times 41$
b) 205 $= 5 \times 41$
c) 121 $= 11^2$
d) 48 $= 2^4 \cdot 3$

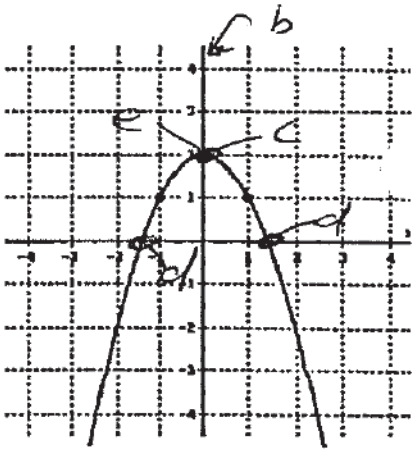
(6)

7) Graph the following quadratic equation: $y = (x-2)^2 + 3$



8) (a) Write a quadratic equation to represent the following graph of a parabola.
b) Label the axis of symmetry (b)
c) Label the vertex (c)
d) Label the zeros (d)
e) Label the y-intercept (e)

$y = -x^2 + 2$



9) Factor the following polynomials completely.

a) $4x^3y - 4x^2y - 8xy$ $\quad 4xy(x^2 - x - 2)$ $\quad 4xy(x-2)(x+1)$

b) $2x(25x^6 - 36) = 2x(5x^3 - 6)(5x+6)$

c) $4x^6 - 30x^5 + 36x^4$ $\quad 2x^4(2x^2 - 15x + 18)$ $\quad 2x^4(2x-3)(x-6)$

d) $xy^4 - 81x$ $\quad x(y^2+9)(y-3)(y+3)$

10) Factor the following polynomials completely.

a) $64x^2 - 25y^2$ $\quad (8x-5y)(8x+5y)$

b) $25x^2 + 20x + 4$ $\quad (5x+2)^2$

c) $9x^2 - 6x + 1$ $\quad (3x-1)^2$

**d) $x^{12} - 16$ $\quad (x^6-4)(x^6+4)$ $\quad (x^3-2)(x^3+2)(x^6+4)$

11) Factor the following polynomials completely.

a) $6x^2 - 29x - 5$ $\quad -30, -29$ $\quad (x-5)(6x+1)$

b) $9x^2 + 17x + 8$ $\quad (9x+8)(x+1)$

c) $24x^2 - 49x + 2$ $\quad (24x-1)(x-2)$

d) $-3x^2 - x + 2$ $\quad -(3x^2+x-2) = -(x-1)(3x+2)$

12) The area of a rectangle is $(3x^2 - 4x - 15)in^2$. What are the width and length of the rectangle in terms of x?

	x	-5
$6x$	$6x^2$	$-30x$
1	$+x$	-5

	x	$+1$
$9x$	$9x^2$	$9x$
$+8$	$8x$	8

72, 17

	$3x$	$+2$
x	$3x^2$	$+2x$
-1	$-3x$	-2

-6, 1

-45, -4

	x	-3
$3x$	$3x^2$	$-9x$
5	$+5x$	-15

	x	-2
$24x$	$24x^2$	$-48x$
-1	$-x$	2

45, -49

$(3x+5)(x-3)$

l $\quad w$

Name: Key

Algebra II – Test 5

2/23/2016

(2x − 1)(x − 1)

1) Solve the following quadratics by factoring.

(12) a) $2x^2 - 3x + 1 = 0$ $x = \frac{1}{2}, 1$

b) $x^2 + 8x + 15 = 0$ $(x+3)(x+5)$ $x = -3, -5$

-12, 1 → $2x(6x^2 + 4x)$, $-1(-3x - 2)$ → $3x + 2$

c) $x^2 - 13x + 22 = 0$ $x = 11, 2.$

d) $+6x^2 + x + 2 = 0$ ( )($x = -\frac{2}{3}, \frac{1}{2}.$

2) You have used all five ways of solving a quadratic equation. Name all five of the ways **AND** state what they are useful for. (OR, when would you chose to use one over another?)

(5)

1) Graphing → always works
2) factoring → fastest.
3) Square root → no "b"
4) Completing square → circles, vertex form
5) Quadratic formula → silver bullet.

3) The $f(x)$ function can model the distance a projectile is from the ground where f is measure in feet and x is in seconds. $f(x) = -16x^2 + 45x + 200$.

(6) a) What does a_0 being negative mean? (Why is it negative?) → going down

b) What does v_0 being ~~negative~~ mean? (Why is it ~~negative~~?) → thrown up.

c) What is the velocity of the projectile? → 45 ft/sec.

d) What height is the projectile launched from? 200 ft.

e) How long after being launched until the projectile hits the ground?

$\sqrt{14825} = 121.76$

$\frac{-45 \pm \sqrt{45^2 + 4 \cdot 16 \cdot 200}}{-32}$

5.2 sec.

4) Use the discriminant to determine how many and what kind of solutions you would get for the following.

(6)

a) $x^2 - 10x + 25 = 0$

b) $2x = 3 + 2x^2$
$2x^2 - 2x + 3$

c) $3 + x^2 = -4x$
$x^2 + 4x + 3 = 0$

Discriminant	Number/type of solutions
0	1 Real.
$4 - 4 \cdot 2 \cdot 3 = -20$	2 imaginary.
$16 - 12 = 4$	2 Real.

5) Using $ax^2 + bx + c = 0$, then

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

6) Solve the following quadratics using square roots.

(8) a) $x^2 = 36$ $x = \pm 6$

b) $x^2 - 196 = 0$ $x = \pm 14$

c) $x^2 + 49 = 0$ 2 imaginary.

d) $x^2 + 4 = 13$

$x = \pm 3$

7) For each of the following quadratics, find the vertex, the axis of symmetry, the y-intercept, the zeros, the domain and range, how it opens.

10
9

Functions	Graph opens	Axis of symmetry	Vertex	Zeros	Domain and Range	y-intercept
a) $y = x^2 - 10x + 9$	up	$x = 5$	$(5, -16)$	$(1, 0)$ $(9, 0)$	D: $(-\infty, \infty)$ R: $[-16, \infty)$	$(0, 9)$
b) $y = x^2 - 6x + 8$	up	$x = 3$	$(3, -1)$	$(2, 0)$ $(4, 0)$	R: $[-1, \infty)$	$(0, 8)$
c) $y = 3x^2 - 13x + 4$	up.	$x = \frac{13}{6}$	$(\frac{13}{6}, -10.083)$	$(\frac{1}{3}, 0)$ $(4, 0)$	R: $[-10.083, \infty)$	$(0, 4)$

8) Solve the following systems of nonlinear equations.

(12)

a) $\begin{cases} y = x^2 - 3 \\ x - 6y = 18 \end{cases}$

$x - 6x^2 + 18 = 18$

$x = 0, \frac{1}{6}$.

$(-2, 5)$

$(3, 15)$

b) $\begin{cases} y = 2x^2 - 3 \\ y = 2x + 9 \end{cases}$

$2x^2 - 3 = 2x + 9$

$2x^2 - 2x - 12 = 0$

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

$x = 3, -2$

c) $\begin{cases} y = 2x^2 - 8x + 3 \\ y = 6x - 21 \end{cases}$

$2x^2 - 8x + 3 = 6x - 21$

$2x^2 - 14x + 24 = 0$

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

$x = 3, 4$

$(3, -3)$

$(4, 3)$

d) $\begin{cases} y = x^2 + 4x + 7 \\ y = x + 5 \end{cases}$

$x^2 + 4x + 7 = x + 5$

$x^2 + 3x + 2 = 0$

$x = -1, -2.$

$(-2, 3)$

$(-1, 4)$

9) Our schools revenue can be modeled by the equation $C(t) = 0.75t^2 + 10t + 200$. Where t represents the number of students here. The weekly cost of running our school is modeled by: $C(t) = 80t + 700$. How many students must our school have to break even (when revenue equals the costs)?

(3)

$.75t^2 - 70t - 500 = 0$

$t = 100$

10) Solve the following quadratics using any method. Leave your answers in the simplest radical form.

(12)

a) $x^2 + 2x + 9 = 0$

2 imaginary.

b) $3x^2 - 11x - 4 = 0$

$x = 4, -\frac{1}{3}$

c) $x^2 - 20 = 0$

$x = \pm 2\sqrt{5}$

d) $2x = 3 + 2x^2$

2 imaginary.

11) Find two integers whose product is 160 and whose sum is -28.

(2)

$-8, -20$

Name: Key
Algebra II – Test 6
3/24/2016

$\frac{24 \pm \sqrt{24^2 - 4 \cdot 149}}{2}$

1) Solve the following equations. Leave your answer in the simplest radical form. $12 \pm 4i\sqrt{5}$

a) $x^2 + 25 = 0$ $\pm 5i$

b) $-149 = x^2 - 24x + 149$ 0

(12)

c) $x^2 + 18 = 6x$ $+6x$ $\frac{-6 \pm \sqrt{36 - 4 \cdot 18}}{2} = \frac{-6 \pm 6i}{2}$ $3 \pm 3i$

d) $0 = 3x^2 + 4x + 3$ $\frac{-4 \pm \sqrt{16 - 4 \cdot 3 \cdot 3}}{6}$ $\frac{-4 \pm 2i\sqrt{5}}{6} = -\frac{2}{3} \pm \frac{i\sqrt{5}}{3}$

2) Find the values of x and y that make each equation true.

a) $2ci + 1 = -d + 6 - ci$ $2c = -c$ $c = 0$ $1 = -d + 6$ $d = 5$

(6)

b) $c^2 + 4i = d + di$ $d = 4$ $c^2 = 4$ $c = \pm 2$

3) State the conjugate of each of the following complex numbers.

a) $-i^3 + 1i = -i$

b) $2i - 6$ $-6 - 2i$

(3)

4) Multiply the following complex numbers.

a) $(5 + 6i)(2 + i)$ $10 + 17i - 6 = 4 + 17i$

b) $7i^{42}(-3i + 14)$ i^2 $14 - 3i$

(12)

c) $(7 + 5i)(7 - 5i)$ 49 25 74

d) $(1 + 2i)(2 - 1i)$ $2 + 3i + 2 = 4 + 3i$

5) Add/subtract the following complex numbers. Given: $z = 8 + 9i$ & $w = 2 - 3i$

a) $z - 5w$ $8 + 9i - 10 + 15i = -2 + 24i$

(8)

b) $-4z + 2w$ $-32 - 36i + 4 - 6i = -28 - 42i$

c) $z + w$ $10 + 6i$

d) $2z - 2w$ $16 + 18i - 4 + 6i = 12 + 24i$

(4)

6) Find the absolute value of each complex number using the values of z & w above.

a) z $\sqrt{145}$ $145 = 5 \cdot 29$

b) w $\sqrt{13}$ $4, 9$

7) Simplify and write your answer in the form $a + bi$. $-i$ i

a) $2i^{51} - 3i^{41}$ $-2i - 3i = -5i$

(12)

b) $5i^{35} - 6i^{109}$ $-5i - 6i = -11i$

c) $\frac{(2+5i)}{1-2i}\frac{(1+2i)}{(1+2i)} = \frac{-8 + 9i}{5} = -\frac{8}{5} + \frac{9}{5}i$

d) $\frac{(3+7i)}{3i}\frac{-3i}{-3i} = \frac{-9i + 21}{9} = \frac{7}{3} - i$

$2 + 9i - 10$

8) Solve the following inequalities:

a) $3x^2 - 3x - 1 > -1$

b) $2x^2 - 9x + 5 \leq -4$

c) $x^2 + 13x + 45 < 5$

d) $x^2 - x + 5 < 11$

9) Put the following equations in vertex form and identify the vertex.

a) $y = x^2 + 12x - 17$

b) $y = -3x^2 - 12x + 20$

c) $y = x^2 + 14x$

d) $-4x^2 - 16x + y - 17 = 0$

10) Use the information provided to write the standard form of a circle AND identify the center and radius.

a) $6x + x^2 - 10y = 30 - y^2$

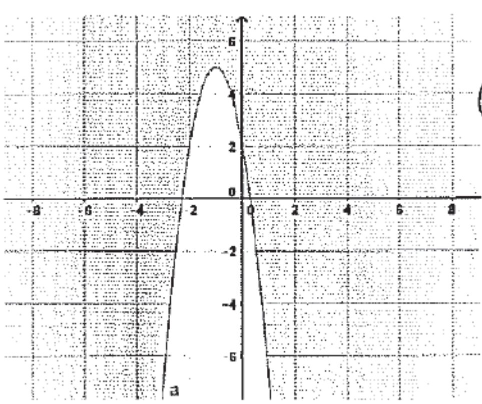
b) $x^2 + y^2 - 22x + 18y + 102 = 0$

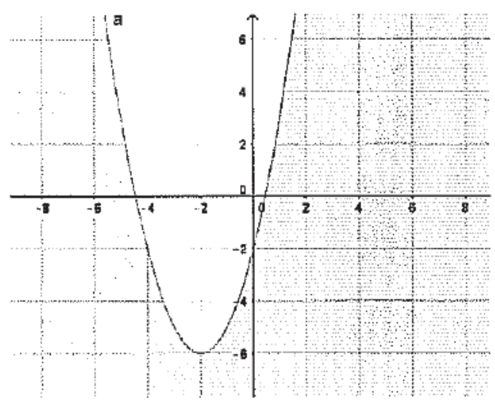
c) Center: $(13, -2)$;Diameter: 16

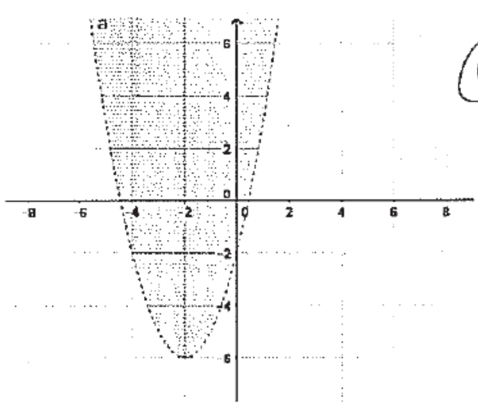
d) $(x+3)^2 + (y-2)^2 = 20$

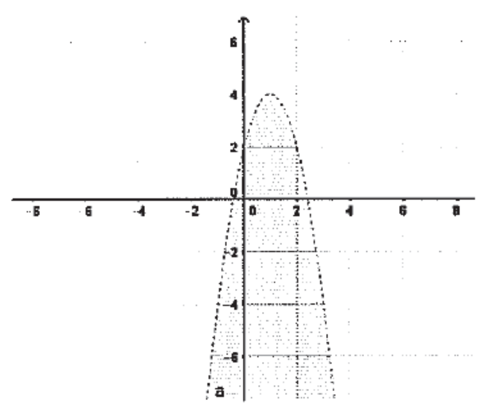
Translated 3 units right and 7 units down

11) Matching! Match the graph to the inequality that describes it.









a) $y < x^2 + 4x - 2$

b) $y \leq x^2 + 4x - 2$

c) $y > x^2 + 4x - 2$

d) $y > -x^2 - 4x + 2$

e) $y < -2x^2 + 4x + 2$

f) $y \geq -3x^2 - 6x + 2$

Name: Key
Algebra II Test 7
5/3/2016

1) Create Pascal's Triangle down to the 5th row (degree 4)

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

2) Expand the following

a) $(2-i)^4$ $2^4 + 4(2)^3(-i) + 6(2)^2(-i)^2 + 4(2)^2(-i)^3 + (-i)^4$
$16 - 32i - 24 + 8i + 1 = \boxed{-7 - 24i}$

b) $(a+2b)^3$ $a^3 + 3a^2(2b) + 3(a)^1(2b)^2 + (2b)^3 = \boxed{a^3 + 6a^2b + 12ab^2 + 8b^3}$

3) Give a summarized definition of what each of the following theorems tell you.

a) Fundamental Theorem of Algebra: degree = # soln
b) Complex Root Theorem: } come in pairs.
c) Irrational Root Theorem: }
d) Rational Root Theorem: → $\frac{p}{q}$ = factors of constant term / factors of leading term.

4) Divide by using synthetic division.

$(x^4 - 3x^3 - 7x - 14) \div (x-4)$

4	1	−3	0	−7	−14
		4	4	16	36
	1	1	4	9	22

$x^3 + x^2 + 4x + 9 + \frac{22}{x-4}$

5) Multiply the following complex numbers.

a) $(1+2i)(3i-5)$ $3i - 5 + 6i^2 - 10i = -11 - 7i$

b) $3i^{85}(4i+6)$ $12i^2 + 18i$
$\boxed{-12 + 18i}$

6) Multiply.

$(x^2 - 2x + 7)(4x^3 + 3x^2 - x^2)$

	$4x^3$	$+2x^2$
x^2	$4x^5$	$2x^4$
$-2x$	$-8x^4$	$-4x^3$
7	$28x^3$	$14x^2$

$4x^5 - 6x^4 + 24x^3 + 14x^2$

7) When you divide 65 by 4, what are each of the following numbers called?

$4\overline{)65}$ → 16, remainder 1

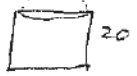
a) 65 = dividend.
b) 16 = quotient.
c) 4 = divisor
d) 8 = nothing
e) 1 = remainder.
f) When dividing (either way), you always have to watch for ghost (missing.) variables that are supposed to be there.

8) Divide by using long division.

$(x^3 - 7x^2 + 12x) \div (x^2 - 3x) = \boxed{x-4}$

$x^2 - 3x \;\overline{)\; x^3 - 7x^2 + 12x}$
$- x^3 + 3x^2$
$-4x^2 + 12x$
$+4x^2 + 12x$
0

9) A grain silo is shaped like a cylinder with a hemisphere top. The cylinder is 20 feet tall. The volume of the silo is $2106\pi ft^3$. Find the radius of the silo.



$V_{silo} = V_c + V_h$
$= \pi r^2 h + \frac{1}{2} \cdot \frac{4}{3}\pi r^3$
$2106\pi = \pi r^2 (20) + \frac{2}{3}\pi r^3$
$\frac{2}{3}r^3 + 20r^2 - 2106 = 0$
* graph to find.

9	$\frac{2}{3}$	20	0	−2106
		6	234	2106
	$\frac{2}{3}$	26	234	0

$\boxed{r = 9ft}$

10) Write the simplest polynomial function with the given zeros.

$\sqrt{3}, -4, 8$
$(x^2 - 3)(x+4)(x-8)$
$x^4 - 4x^3 - 28x^2 - 16x - 128$

11) Find the product.

a) $(x^2 + y^3)(x^3 - 4x^2y - 8y^2)$
$x^5 - 4x^4y + x^3y^2 - 8x^2y^2 - 8y^5 - 4x^2y^3 - 8y^4$

b) $(2x^2 + 3)(4x^2 - 6x^2 + 9)$
$\boxed{-4x^4 + 12x^2 + 27}$

12) Divide by using synthetic division.

$2x + 3 + \frac{1}{x+2}$ $(2x^2 + 7x + 7) \div (x + 2)$

$-2 \mid 2 \quad 7 \quad 7$
$\quad\quad\quad -4 \quad -6$
$\quad\quad 2 \quad 3 \quad 1$

13) Identify all the roots of the equation:

$x = 9, \frac{5 \pm \sqrt{29}}{2}$ $x^3 + 9 - 6x^2 = -4(11x - 2x^2)$ $-44x + 8x^2$ $x^3 - 14x^2 + 44x + 9 = 0$.

14) Use synthetic substitution to evaluate the polynomial for the given value.

a) $P(x) = x^3 - 5x + 3$ for $x = -1$ $P(-1) = 7$

$-1 \quad +5 \quad +3$

b) $P(x) = 9x^3 - 15x^2 - 3x + 2$ for $x = 1$ $P(1) = -7$

15) There are three special cases to watch for when factoring polynomials. Demonstrate how each of them factors using a's and b's.

a) Difference of two squares: $a^2 - b^2 = (a+b)(a-b)$

b) Sum of two cubes: $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

c) Difference of two cubes: $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

16) Multiply.

a) $7xy(4x^2y^3 + 3x^4y^3)$ $28x^3y^4 + 21x^5y^4$

b) $3x(x+1)^4$ $3x^5 + 12x^4 + 18x^3 + 12x^2 + 3x$

17) Factor completely:

a) $8x^3 + y^3$ $(2x + y)(4x^2 - 2xy + y^2)$

b) $x^3 - 5x^2 + 3x - 15$ $(x^2 + 3)(x - 5)$

18) Identify the roots of the equation.

$x^3 + 2x^2 - 11x - 12 = 0$

$x = -1, 3, -4$

19) Identify all the roots of the equation:

$x^4 - x^3 - 31x^2 + 25x + 150 = 0$

$x = 3, 5, -2, -5$

20) Divide by using long division.

$x^2 + 4x + 7 + \frac{12}{x-2}$ $(x^3 + 2x^2 - x - 2) \div (x - 2)$

21) Find all the roots the following equation.

$x^3 - 7x^2 + 14x - 6 = 0$

$3, 2 \pm \sqrt{2}$.

Name: Key
1/8/2016
Algebra II Quiz

1) What are m and b in the slope-intercept form of a line?

Slope & y-inter.

2) Given the following information, find the equation of the line in slope-intercept form.

a) Slope: -3, y-intercept: 4 $y = -3x + 4$

b) Slope: 2, Passes through: $(2, 1)$ $y = 2x + -3$

3) Match the following general transformations with their descriptions.

D $f(x) \rightarrow f(x+3)$
~~H~~ $f(x) \rightarrow f(3x)$
G $f(x) \rightarrow 3f(x)$
E $f(x) \rightarrow f(x)+3$
A $f(x) \rightarrow -f(x)$
B $f(x) \rightarrow f(-x)$

A) Reflection across x-axis
B) Reflection across y-axis
C) Right 3
D) Left 3
E) Up 3
F) Down 3
G) Vertical Stretch by 3
H) Vertical Compression by $\frac{1}{3}$
I) Horizontal Stretch by 3
J) Horizontal Compression by $\frac{1}{3}$

4) Given the following lines perform the following **consecutive** transformations. Simplify each time.

$f(x) = x+2 \rightarrow f(x+2) \rightarrow f(x)-1 \rightarrow 3f(x) \rightarrow -f(x)$

a) $f(x) = x+4$ b) $x+3$ c) $3x+9$ d) $-3x-9$.

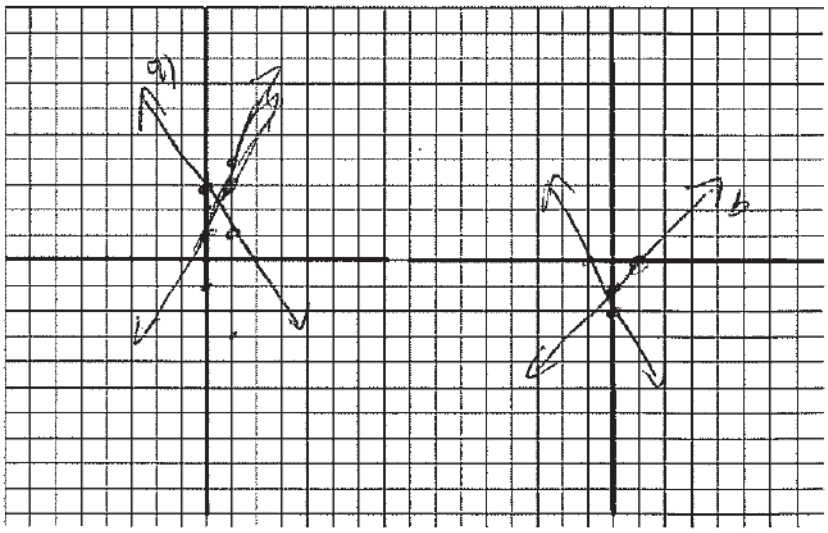
5) Graph the following lines and their transformations on the same graph.

a) $y = -2x + 3$

-Down 4, Reflect across x-axis

b) $y = x - 1$

-Reflect y-axis, Vertical Stretch by 2



Name: Key

1/15/2016

Algebra II Quiz

1) Write the prime factorization of each number.

a) 18 $2 \cdot 3^2$ b) 150 $2 \cdot 3 \cdot 5^2$

2) Find the GCF of each pair of numbers.

a) $8x^2, 11$ 1 b) $-64x^4, 24x^2$ $8x^2$

3) Factor each polynomial.

a) $-15x + 10x^2$ $-5x(2x+3)$ b) $33x^3 + 22x^2 + 11x$ $11x(3x^2 + 2x + 1)$

4) Factor each expression

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

b) $5(3x-2) + x(3x-2)$ $(5+x)(3x-2)$

5) Factor each polynomial by grouping.

a) $x^3 + 3x^2 + 5x + 15$ $x^2(x+3) + 5(x+3) = (x^2+5)(x+3)$

b) $2x^3 - x^2 - 3 + 6x$ $x^2(2x-1) + 3(2x-1) = (x^2+3)(2x-1)$

c) $5x^2 - x^3 + 3x - 15$ $-x^2(x-5) + 3(x-5) = (-x^2+3)(x-5)$

6) What does it mean to factor something?

↳ write as a product.

Name: Key

1/22/2016

Algebra II Quiz

1) Sect 7.3 HW. Factor the following polynomials.

a) $x^2 + 12x + 11 = (x+1)(x+11)$

b) $x^2 - 10x - 24 = (x-12)(x+2)$

2) Sect 7.4 HW. Factor the following polynomials.

a) $6x^2 + 11x + 4$ $(2x+1)(3x+4)$

b) $-3x^2 + 16x - 16$ $-(x-4)(3x-4)$

3) Sect 7.5 HW. Factor the following polynomials.

a) $25y^2 - 16x^2 = (5y-4x)(5y+4x)$

b) $4x^2 - 4x + 1 = (2x-1)^2$

4) Sect 7.6 HW. Factor the following polynomials.

a) $4x^6 - 30x^5 + 36x^4 = 2x^4(x-6)(2x-3)$ $2x^2 - 15x + 18$

b) $xy^4 - 16x$ $x(y^2+4)(y-2)(y+2)$

5) Sect 7.6 HW. Factor the following polynomials completely

a) $12(x+1)^2 + 60(x+1) + 75$ $3(2(x+1)+5)^2$

b) $45x(x-2)^2 + 60x(x-2) + 20x$ $5x(3(x-2)+2)^2$

$(9y^2 + 12y + 4)$

6) Fill in the blanks for the steps to factor things completely

1) GCF

-Watching to make sure the first term is positive

2) Binomial

-Check for diff $\square^2$ (special case)

3) Trinomial

-Best to use ac method.

box - diamond.

Name: Key.
2/5/2016
Algebra II Quiz

1) For each of the following quadratics, find the vertex, the axis of symmetry, the y-intercept, the zeros, the domain and range, how it opens.

Functions	Graph opens	Axis of symmetry	Vertex	Zeros	Domain and Range	y-intercept
a) $y = x^2 - x$	up	$x = 1/2$	$(\frac{1}{2}, -\frac{1}{4})$	0, 1	D: $(-\infty, \infty)$ R: $[-\frac{1}{4}, \infty)$	(0, 0)
b) $y = -x^2 - 2x + 3$	down	$x = -1$	$(-1, 4)$	$-3, 1$	D: $(-\infty, \infty)$ R: $(-\infty, 4]$	(0, 3)

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

2) Order the following functions from widest to narrowest.

$f(x) = \frac{1}{2}x^2 + 3$ $\quad h(x) = -\frac{1}{8}x^2$ $\quad g(x) = 8x^2 - 2$ $\quad R(x) = -2x^2$ $\quad Q(x) = x^2$

$h(x), f(x), Q(x), R(x), g(x)$

3) You drop a tennis ball out our math room window which is 32ft off the ground.

a) Write an equation to represent this situation. $f(x) = -16x^2 + 32$

b) How long does it take to reach the ground? 1.41 sec.

4) A fireworks shell is fired from a mortar. Its height is modeled by the function: $f(x) = -16x^2 + 224x$, where x is the time in seconds and f is the height in feet. Using a graphing device:

a) The shell is supposed to explode at its maximum height. What height should it explode at? (7, 784 ft)

b) If the shell is a dud, how long will it take to return to the ground? 14 sec.

5) Solve the following quadratic equations by graphing.

a) $3x^2 - 27 = 0$ $\quad \pm 3$

b) $5x^2 - 12x + 10 = x^2 + 10x$ $\quad 5, \frac{1}{2}$

$4x^2 - 22x + 10 = 0$

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

	x	-5
$2x$	$2x^2$	$-10x$
-1	$-1x$	$+5$

10
-11

Name: Key
2/12/2016
Algebra II Quiz

1) A basic formula used to model a projectile's height is given as: $h = \frac{1}{2}a_0t^2 + v_0t + h_0$. What do each of the coefficients/constant represent?

a_0 → initial acceleration
v_0 → initial velocity
h_0 → initial height

b) How would you say "v_0"

✓ not.

2) Solve the following quadratics using square roots.

a) $x^2 = 169$ $x = \pm 13$
b) $x^2 - 625 = 0$ $x = \pm 25$
c) $x^2 + 25 = 0$ imaginary

3) Solve the following quadratic by completing the square.

$x^2 + 6x = 16$

$x^2+6x+9 = 16+9$
$(x+3)^2 = 25$
$x = -3 \pm 5 = -8, 2$

4) The height of a rocket is meters is approximated by $h = -5t^2 + 60t$, where h is the height in meters and t is the time in seconds.

$-5t(t-12)$

a) How long after being launched until the rocket hits the ground? 12 sec
b) How fast is the rocket travelling? *Be careful of your units.

60 m/sec.

5) Solve each quadratic by factoring.

a) $x^2 - 2x - 8 = 0$ $(x-4)(x+2)$ $x = 4, -2$.
b) $4x^2 - 9x = -2$

$x = 2, \frac{1}{4}$.

	x	-2
$4x$	$4x^2$	$-8x$
-1	$-x$	$+2$

-8
-9

* for 5.

6) You have used four out of the five ways of solving a quadratic equation. Name three of the ways **AND** state what they are useful for. (OR, when would you chose to use one over another?)

1) Graphing
→ primative, always works.
2) Factoring
→ fastest.
3) Square root.
→ no "b" term.

---

4) Completing the square
→ other things.
5) Quadratic formula
→ "silver bullet"

Name: Key.
2/18/2016
Algebra II Quiz

1) Solve the following systems of nonlinear equations. *Give your answers as a point!!

(6)

a) $\begin{cases} y = x^2 - 4 \\ y = 5x - 10 \end{cases}$ $5x-10 = x^2-4$ $x^2-5x+6=0$ $x=2,3$ (2, 0) (3, 5)

b) $\begin{cases} y = 2x^2 - 3 \\ y = 2x + 9 \end{cases}$ $2x^2-3=2x+9$ $2x^2-2x-12=0$ $x^2-x-6=0$ $x=3,-2$ (6, 21) (-1, 7) (3, 5) (-2, 5)

2) The $f(x)$ function can model the distance a projectile is from the ground where f is measure in feet and x is in seconds. $f(x) = -16x^2 + 63x + 10$.

(4)

a) What does a_0 being negative mean? (Why is it negative?) → gravity is pulling it down.
b) What is the velocity of the projectile? → 63 ft/s.
c) What height is the projectile launched from? 10 ft.
d) How long after being launched until the projectile hits the ground? 4.1 sec. $\frac{-63 \pm \sqrt{63^2 - 4 \cdot 10 \cdot -16}}{-32}$ 4609 67.8

3) Using $ax^2 + bx + c = 0$, then

(1)

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

4) Solve the following equations using the quadratic formula. Leave your answers in simplest radical form. (not decimal!)

(4)

a) $x^2 = 2x + 9$ $x^2-2x-9=0$ $x = \frac{2 \pm \sqrt{4+36}}{2} = 1 \pm \sqrt{10}$
b) $0 = 2x^2 - x - 21$ $x = \frac{1 \pm \sqrt{1+168}}{4} = \frac{1 \pm 13}{4}$ 13 169 $\frac{14}{4}, \frac{-12}{4} = \frac{7}{2}, -3$

5) Use the discriminant to determine how many and what kind of solutions you would get for the following.

(3)

a) $+3x^2 + 2x = 1$ $4 - 4 \cdot 3 \cdot 1 = -8$ 2 imaginary.
b) $\frac{1}{2}x^2 + x - 3 = 0$ $1 + 3 \cdot 4 \cdot \frac{1}{2} = 7$ 2 Real.
c) $8x + x^2 = -16$ $x^2+8x+16$. $64 - 4 \cdot 16 \cdot 1 = 0$ 1 Real.

6) You have used all five ways of solving a quadratic equation. Name all five of the ways **AND** state what they are useful for. (OR, when would you chose to use one over another?)

(3)

1) Graphing → primative (always works)
2) factoring → fastest
3) Square Root → no "b" term
4) Completing the square → circles, conics.
5) Quadratic formula → silver bullet.

**7) Describe how the vertex is related to the x-intercepts of a parabola. Think about the quadratic formula and how that ties back to the graph.

Vertex is the center of the x-inter.
* you add/subtract the same thing from the vertex to get to the x-intercepts.

Name: Key
3/11/2016
Algebra II Quiz

1) Solve the following equations.

a) $x^2 + 36 = 0$ $x = \pm 6i$

b) $0 = x^2 + 4x + 8$ $\frac{-4 \pm \sqrt{16 - 32}}{2} = \frac{-4 \pm 4i}{2} = -2 \pm 2i$ (-16)

2) Find the values of x and y that make each equation true.

a) $5(x - 1) + 3yi = -15i - 20$ $3y = -15$ $y = -5$ $x = -3$

b) $x + 3xi = 4 + yi$ $3x = y$ $x = 4$ 12

3) State the conjugate of each of the following complex numbers.

a) $-2.5i + 1$ $1 + 2.5i$

b) $\frac{i}{10} - 6$ $-6 - \frac{i}{10}$

4) Multiply the following complex numbers.

a) $(2 - 3i)(7 + 4i)$ $14 + 8i - 21i + 12 = 26 - 13i$

b) $i^{44}(-67i + 10)$ $10 - 67i$

5) Add/subtract the following complex numbers. Given: $z = 5 + 7i$ & $w = 7 - 5i$

a) $z + 2w$ $5 + 7i + 14 - 10i = 19 - 3i$

b) $-3z + w$ $-15 - 21i + 7 - 5i = -8 - 26i$

6) Find the absolute value of each complex number using the values of z & w above.

a) z $\sqrt{74}$

b) w $\sqrt{25 + 49} = \sqrt{74}$

7) Simplify and write your answer in the form $a + bi$.

a) $i^{52} - i^{48} = 0$

b) $\frac{(1+i)}{-2+4i}\frac{(-2-4i)}{(-2-4i)}$ $\frac{2 - 6i}{20}$ $-2 - 4i - 2i + 4$

$\frac{1}{10} - \frac{3}{10}i$

Name: Key

4/8/2016

Algebra II Quiz

1) Create Pascal's Triangle down to the 5th row (degree 4)

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

2) Expand the following

a) $(2-3i)^4$ $2^4 + 4(2)^3(-3i) + 6(2)^2(-3i)^2 + 4(2)(-3i)^3 + (-3i)^4$

$16 + -96i - 216 + 216i + 81 = -119 + 120i$

b) $(a-2b)^3$ $a^3 + 3a^2(-2b) + 3a(-2b)^2 + (-2b)^3 = a^3 - 6a^2b + 12ab^2 - 8b^3$

3) Find the product.

a) $(2x+5y)(3x^2-4xy+2y^2)$ $6x^3 + 7x^2y - 16xy^2 + 10y^3$

b) $(x^3+x^2+1)(x^2-x+5)$ $x^5 + 4x^3 + 6x^2 - x + 5$.

4) Multiply the following complex numbers.

a) $(4+i)(7+4i)$ $28 + 16i + 7i - 4 = 24 + 23i$

b) $i^{67}(-67i+10)$ $-67 - 10i$

5) Multiply.

a) $7x^4(15y^7 - 9x^3y + 3)$ $105x^4y^7 - 63x^7y + 21x^4$

b) $2(x-3)^4$ $2[(x)^4 + 4(x^3)(-3) + 6(x^2)\cdot 9 + 4x(-3)^3 + (-3)^4] = 2x^4 - 24x^3 + 108x^2 - 216x + 16$

6) Multiply.

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

$x^6 - 2x^5 + 4x^4 - 6x^3 + 2x^2 - 3$.

	$3x^2$	$-4xy$	$2y^2$
$2x$	$6x^3$	$-8x^2y$	$4xy^2$
$5y$	$15x^2y$	$-20xy^2$	$10y^3$

	x^3	x^2	1
x^2	x^5	x^4	x^2
$-x$	$-x^4$	$-x^3$	$-x$
5	$5x^3$	$5x^2$	5

	x^4	$-2x^3$	x^2	-1
x^3	x^6	$-2x^5$	x^4	$-x^2$
3	$3x^4$	$-6x^3$	$3x^2$	-3.

Name: Key

4/15/2016

Algebra II Quiz

$$4\overline{)87}\quad 21,\ 8,\ 07,\ -4,\ 3$$

1) When you divide 87 by 4, what are each of the following numbers called?

a) 87 = dividend

b) 4 = divisor

c) 21 = quotient.

d) 3 = Remainder

e) 1 = nothing

f) When dividing (either way), you always have to watch for missing/ghost variables that are supposed to be there.

2) Divide by using long division.

$$(6x^2 - 7x - 5) \div (3x - 5)$$

$$3x-5\overline{)6x^2-7x-5}\quad 2x+1,\ -6x^2+10x,\ 3x-5,\ -3x+5,\ 0$$

3) Divide by using long division.

$$(x^4 + 6x^3 + 6x^2) \div (x + 5)$$

4) Divide by using synthetic division.

$x^2 - \#1$

$$(x^3 + 2x^2 - x - 2) \div (x + 2)$$

$$-2\ |\ 1\ \ 2\ \ -1\ \ -2 \quad (-2,\ 0,\ 2) \quad 1\ \ 0\ \ -1\ \ 0$$

5) Divide by using synthetic division.

$$(4x^2 + 5x + 1) \div (x + 1)$$

$4x + 1$

$$-1\ |\ 4\ \ 5\ \ 1 \quad (-4,\ -1) \quad 4\ \ 1\ \ 0$$

6) Use synthetic substitution to evaluate the polynomial for the given value.

a) $P(x) = 2x^2 - 5x - 3$ for $x = 4$ $\quad P(4) = 9$

$$4\ |\ 2\ \ -5\ \ -3 \quad (8,\ 12) \quad 2\ \ 3\ \ 9$$

b) $P(x) = 3x^3 - 5x^2 - x + 2$ for $x = -\frac{1}{3}$

$$-\tfrac{1}{3}\ |\ 3\ \ -5\ \ -1\ \ 2 \quad (-1,\ 2,\ -\tfrac{1}{3}) \quad 3\ \ -6\ \ 1\ \ 1\tfrac{2}{3}$$

**Bonus

Factor: $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$.

$$x+5\overline{)x^4+6x^3+6x^2+0x+0}\quad x^3+x^2+x-5+\frac{25}{x+5},\ -x^4+5x^3,\ x^3+6x^2,\ -x^3+5x^2+0x,\ x^2+0x,\ -x^2+5x,\ -5x+6,\ +5x+25,\ 25$$

Name: Key
2/12/2016
Algebra II Quiz

1) A basic formula used to model a projectile's height is given as: $h = \frac{1}{2}a_0t^2 + v_0t + h_0$. What do each of the coefficients/constant represent?

a_0 → initial acceleration
v_0 → initial velocity
h_0 → initial height

b) How would you say "v_0"

✓ not.

2) Solve the following quadratics using square roots.

a) $x^2 = 169$ $x = \pm 13$
b) $x^2 - 625 = 0$ $x = \pm 25$
c) $x^2 + 25 = 0$ imaginary

3) Solve the following quadratic by completing the square.

$x^2 + 6x = 16$

$x^2+6x+9 = 16+9$
$(x+3)^2 = 25$
$x = -3 \pm 5 = -8, 2$

4) The height of a rocket is meters is approximated by $h = -5t^2 + 60t$, where h is the height in meters and t is the time in seconds.

$-5t(t-12)$

a) How long after being launched until the rocket hits the ground? 12 sec
b) How fast is the rocket travelling? *Be careful of your units.

60 m/sec.

5) Solve each quadratic by factoring.

a) $x^2 - 2x - 8 = 0$ $(x-4)(x+2)$ $x = 4, -2$.
b) $4x^2 - 9x = -2$

$x = 2, \frac{1}{4}$.

	x	-2
$4x$	$4x^2$	$-8x$
-1	$-x$	$+2$

-8
-9

* for 5.

6) You have used four out of the five ways of solving a quadratic equation. Name three of the ways **AND** state what they are useful for. (OR, when would you chose to use one over another?)

1) Graphing
→ primative, always works.
2) Factoring
→ fastest.
3) Square root.
→ no "b" term.

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4) Completing the square
→ other things.
5) Quadratic formula
→ "silver bullet"