Name: _____ Date: _____

Pre – Calculus Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

Learning Goal 0.1	Expectations for graphing from previous years.

Developing		
1. Graph the following equations		
a. $y = 2x + 1$	b. $y = {}^{2}/_{3}\,x - 4$	c. $y = 3(x + 2)$
https://www.desmos.com/calculator/pwlcwoosqh		
d. $y = x + 3$	e. $y = {}^{-5x}/_{4}$	f. $y = -x + 2$
https://www.desmos.com/calculator/olvb4uq5md		
g. $y = {}^{-6x}/_{5} - 1$	h. $y - 2 = {}^{-5}/_{4}\,(x - 1)$	i. $y + 1 = {}^{2}/_{5}\,(x - 4)$
https://www.desmos.com/calculator/grqjylc0on		
j. $y - 3 = 2(x + 1)$	k. $y = -{}^{1}/_{2}\,(x + 3)$	l. $y + 5 = {}^{-4}/_{3}\,(x - 1)$
https://www.desmos.com/calculator/xj76qvlp3h		
m. $x + 2y + 6 = 0$	n. $3x + 6y - 12 = 0$	o. $x + 6y - 6 = 0$
https://www.desmos.com/calculator/o8vgylfquf		
p. $2x - 3y - 6 = 0$	q. $3x - y + 6 = 0$	r. $5x + 7y + 35 = 0$
https://www.desmos.com/calculator/zbykdkk0kv		

2. Explain the transformations of the following functions from the original $f(x)$ in the order that you would apply them in.

Developing		
a. $y = 3f(-x)$ • vertical stretch by 3 • reflection over the $y-$ axis	b. $y = f(x - 4) + 6$ • horizontal translation right 4 • vertical translation up 6	c. $y = f(x + 5) - 3$ • horizontal translation left 5 • vertical translation down 3
d. $y = -f(x + 2)$ • reflection over the $x-$ axis • horizontal translation left 2	e. $y = -\frac{1}{2}f(x)$ • vertical stretch by ${}^{1}/_{2}$ • reflection over the $x-$ axis	f. $y = -f\left(\frac{1}{3}x\right)$ • horizontal stretch by 3 • reflection over the $x-$ axis

Name: _____ Date: _____

Pre – Calculus Review

g. $y = -f(-x)$ • reflection over the $y-$ axis • reflection over the $x-$ axis	h. $y = \frac{1}{4}f(5x)$ • vertical stretch by $^1/_4$ • horizontal stretch by $^1/_5$	i. $y = f\left(-\frac{1}{2}x\right)$ • horizontal stretch by 2 • reflection over the $y-$ axis
Proficient		
j. $y = 3f(-x) + 8$ • vertical stretch by 3 • reflection over the $y-$ axis • vertical translation up 8	k. $y = -f\big(2(x-5)\big) + 3$ • reflection over the $x-$ axis • horizontal stretch by $^1/_2$ • horizontal translation right 5 • vertical translation up 3	l. $y = -\frac{1}{4}f(x-7) + 6$ • reflection over the $x-$ axis • vertical stretch by $^1/_4$ • horizontal translation right 7 • vertical translation up 6
m. $y = -3f\big(-(x+1)\big) + 8$ • reflection over the $x-$ axis • reflection over the $y-$ axis • vertical stretch by 3 • horizontal translation left 1 • vertical translation up 8	n. $y = 1.75f(0.25(x-1.5))$ • vertical stretch by 1.75 • horizontal stretch by 4 • horizontal translation right 1.5	o. $y = -\frac{1}{2}f(x+6) - 4$ • reflection over the $x-$ axis • vertical stretch by $^1/_2$ • horizontal translation left 6 • vertical translation down 4
p. $y = 4f\left(\frac{1}{3}(x-2)\right) + 5$ • vertical stretch by 4 • horizontal stretch by 3 • horizontal translation right 2 • vertical translation up 5	q. $y = -\frac{1}{2}f\big(-3(x+4)\big) - 5$ • reflection over the $x-$ axis • reflection over the $y-$ axis • vertical stretch by $^1/_2$ • horizontal stretch by $^1/_3$ • horizontal translation left 4 • vertical translation down 5	r. $y = 5f\big(-2(x+1)\big) - 7$ • reflection over the $y-$ axis • vertical stretch by 5 • horizontal stretch by $^1/_2$ • horizontal translation left 1 • vertical translation down 7
Extending		
s. $y = -3f(-x+7) + 1$ $y = -3f\big(-(x-7)\big) + 1$ • reflection over the $y-$ axis • reflection over the $x-$ axis • vertical stretch by 3 • horizontal translation right 7 • vertical translation up 1	t. $y - 5 = \frac{1}{2}f\left(\frac{2}{3}x - 4\right)$ $y - 5 = \frac{1}{2}f\left(\frac{2}{3}(x-6)\right)$ • vertical stretch by $^1/_2$ • horizontal stretch by $^3/_2$ • horizontal translation right 6 • vertical translation up 5	u. $y + 1 = -f\left(-\frac{1}{2}x + 7\right)$ $y + 1 = -f\left(-\frac{1}{2}(x-14)\right)$ • reflection over the $x-$ axis • reflection over the $y-$ axis • horizontal stretch by 2 • horizontal translation right 14 • vertical translation down 1

Name: _____ Date: _____

Pre – Calculus Review

3. Write an equation for the transformations given from the original function $f(x)$.

Developing
a. Reflection over the $y-$ axis, translations up 5 and left 2. $y = f(-(x+2)) + 5$
b. Horizontal stretch by 6, reflection over the $x-$ axis and right 7. $y = -f\left(\frac{1}{6}(x-7)\right)$
c. Vertical stretch by $^2/_3$, reflection over both axes. $y = -\frac{2}{3}f(-x)$
Proficient
d. Reflection over the $y-$ axis, horizontal stretch by 3, translations down 7 and left 4. $y = f\left(-\frac{1}{3}(x+4)\right) - 7$
e. Horizontal stretch by $^3/_4$, reflection over both axes, translations up 10 and right 12. $y - 10 = -f\left(-\frac{4}{3}(x-12)\right)$
f. Vertical stretch by 3, horizontal stretch by 2, reflection over the $x-$ axis, translation right 5. $y = -3f\left(\frac{1}{2}(x-5)\right)$

4. Graph the original, then the transformed functions. Label any important points, both original and transformed.

Developing		
a. $y = (x-2)^2 - 4$ solution	b. $y = \lvert x+5 \rvert + 3$ solution	c. $y = \sqrt{x-1} + 4$ solution
d. $y = \frac{1}{x+3} - 6$ solution	e. $y = (x-4)^3 + 5$ solution	f. $y = \sqrt[3]{x+6} - 2$ solution
g. $y = -3(x)^2$ solution	h. $y = \lvert -2x \rvert$ solution	i. $y = -\sqrt{4x}$ solution
j. $y = -\frac{2}{x}$ solution	k. $y = \frac{1}{3}(-x)^3$ solution	l. $y = -\frac{1}{2}\sqrt[3]{x}$ solution
Proficient		
m. $y = -\frac{1}{4}(x-1)^2 - 3$ solution	n. $y = \left\lvert -\frac{1}{2}(x+3) \right\rvert + 6$ solution	o. $y = -\sqrt{3(x+2)} + 5$ solution

Name: _____ Date: _____

Pre – Calculus Review

p. $y = -\frac{2}{x+5} + 1$ solution	q. $y = 2(5(x-4))^3 + 3$ solution	r. $y = 4\sqrt[3]{3(x+2)} - 5$ solution
s. $y = -3(x-7)^2 - 5$ solution	t. $y = -\lvert 2(x-4)\rvert - 3$ solution	u. $y = \frac{1}{4}\sqrt{-(x-6)} - 3$ solution
v. $y = \frac{-1}{2(x-3)} + 4$ solution	w. $y = 3(-(x+2))^3 - 1$ solution	x. $y = \sqrt[3]{-\frac{1}{2}(x+1)} + 3$ solution
Extending		
y. $y = -3\left(\frac{1}{4}x + 2\right)^2 + 6$ solution	z. $y = 5\left\lvert -\frac{1}{2}x + 1\right\rvert + 4$ solution	aa. $y = -\frac{1}{2}\sqrt{-3x+9} - 4$ solution
bb. $y = -\frac{2}{3x+4} + 5$ solution	cc. $y = 2(-4x-4)^3 + 3$ solution	dd. $y = -2\sqrt[3]{3x+6} - 1$ solution

Name: _____ Date: _____

Pre – Calculus Review

For each type of question, the achievement level is indicated. Showing work is an important strategy in communicating your knowledge and ideas so please be thorough.

Learning Goal 0.2	Expectations for algebra from previous years.

1. Factor.

Developing	
a. $z^2 + z - 6$ $= (z + 3)(z - 2)$	b. $b^2 - 7b + 12$ $= (b - 3)(b - 4)$
c. $x^2 - 7x - 18$ $= (x - 9)(x + 2)$	d. $p^2 - 5p - 14$ $= (p - 7)(p + 2)$
e. $m^2 - 9m + 8$ $= (m - 8)(m - 1)$	f. $q^2 - 16q + 63$ $= (q - 7)(q - 9)$
g. $24n - n^2 - 25$ $= (25 - n)(n + 1)$	h. $a^2 + 11a - 80$ $= (a + 16)(a - 5)$
i. $20 + 8n - n^2$ $= (10 - n)(n + 2)$	j. $11p - p^2 - 24$ $= (8 - p)(p - 3)$
k. $x^2 - 25$ $= (x - 5)(x + 5)$	l. $a^4 - 4$ $= (a^2 + 2)(a^2 - 2)$
m. $81 - a^2$ $= (9 - a)(9 + a)$	n. $100 - b^6$ $= (10 - b^3)(10 + b^3)$
o. $169 - q^{10}$ $= (13 - q^5)(13 + q^5)$	p. $m^2 - 49$ $= (m + 7)(m - 7)$
q. $144 - n^8$ $= (12 - n^4)(12 + n^4)$	r. $b^{20} - 4$ $= (b^{10} - 2)(b^{10} + 2)$
Proficient	
s. $4g^2 + 11g + 6$ $= (4g + 3)(g + 2)$	t. $36x^2 + 12x + 1$ $= (6x + 1)^2$
u. $6m^2 - 7m - 10$ $= (6m + 5)(m - 2)$	v. $16 - 56z + 49z^2$ $= (7z - 4)^2$
w. $8p^2 - 18p - 5$ $= (4p + 1)(2p - 5)$	x. $81m^2 - 49$ $= (9m + 7)(9m - 7)$
y. $3n^2 - 8n + 4$ $= (3n - 2)(n - 2)$	z. $49a^2 - 100$ $= (7a + 10)(7a - 10)$
aa. $6y^2 + 5y - 6$ $= (3y - 2)(2y + 3)$	bb. $1 + 2b + b^2$ $= (1 + b)^2$
cc. $4a^2 - 17a + 4$ $= (4a - 1)(a - 4)$	dd. $9 - r^2$ $= (3 - r)(r + 3)$

Name: _____ Date: _____

Pre – Calculus Review

ee. $4m^2 - 25$ $= (2m + 5)(2m - 5)$	ff. $125 - 5r^2$ $= 5(5 - r)(5 + r)$
gg. $121p^6 - 25q^4$ $= (11p^3 + 5q^2)(11p^3 - 5q^2)$	hh. $4z^2 - 64$ $= 4(z + 4)(z - 4)$
ii. $900a^2 - 81$ $= 9(10a + 3)(10a - 3)$	jj. $9s^8 - 4t^2$ $= (3s^4 + 2t)(3s^4 - 2t)$
kk. $3r^2 - 2r - 5$ $= (3r - 5)(r + 1)$	ll. $k^4 - 100$ $= (k^2 + 10)(k^2 - 10)$
mm. $5x^2 + 19x + 12$ $= (5x + 4)(x + 3)$	nn. $4t^2 - 4t + 1$ $= (2t - 1)^2$
oo. $24h^2 - 20h - 24$ $= 4(3h + 2)(2h - 3)$	pp. $162v^4 - 2w^4$ $= 2(3v + w)(3v - w)(9v^2 + w^2)$
qq. $10x^2 + 80x + 120$ $= 10(x + 2)(x + 6)$	rr. $4y^2 - 20y - 56$ $= 4(y - 7)(y + 2)$
ss. $-3m^2 - 18m - 24$ $= -3(m + 2)(m + 4)$	tt. $-5n^2 + 40n - 35$ $= -5(n - 7)(n - 1)$
uu. $21 + 66k + 9k^2$ $= 3(3k + 1)(k + 7)$	vv. $10n^2 + 100n + 250$ $= 10(n + 5)^2$
ww. $2x^2 + 5xy + 2y^2$ $= (2x + y)(x + 2y)$	xx. $10p^3 - 1960p$ $= 10p(p + 14)(p - 14)$
yy. $16b^2 + 60b - 100$ $= 4(b + 5)(4b - 5)$	zz. $343b^2 - 7b^4$ $= 7b^2(7 - b)(7 + b)$
aaa. $4b^2 - 35ab + 49a^2$ $= (4b - 7a)(b - 7a)$	bbb. $98n^2 - 200$ $= 2(7n - 10)(7n + 10)$
ccc. $7q^3r^2 + 53q^2r^2 + 28qr^2$ $= qr^2(7q + 4)(q + 7)$	ddd. $81x^4 - 900x^2$ $= 9x^2(3x - 10)(3x + 10)$
eee. $9 - 3p - 2p^2$ $= (3 - 2p)(p + 3)$	fff. $100m^2 + 180m + 81$ $= (10m + 9)^2$
ggg. $2w^2v^2 + 11wv + 5$ $= (2vw + 1)(vw + 5)$	hhh. $400v^2w^4 - 36v^4$ $= 4v^2(10w^2 - 3)(10w^2 + 3)$
Extending	
iii. $3x^{-2/3} - 6x^{1/3} + 3x^{4/3}$ $= \frac{3\sqrt[3]{x}(x - 1)^2}{x}$	jjj. $(x - 1)^{1/2} - (x - 1)^{-1/2}$ $\frac{(x - 2)\sqrt{x - 1}}{x - 1}$
kkk. $(x + 2)^{7/2} - (x + 2)^{3/2}$ $= (x + 2)^{3/2}(x + 3)(x + 1)$	lll. $2x^{1/3}(x - 2)^{2/3} - 5x^{4/3}(x - 2)^{-1/3}$ $= -\frac{3x + 4}{x - 2} \times \sqrt[3]{x(x - 2)^2}$
mmm. $x^{-4} - 25x^{-2} + 144$ $= \frac{(9x - 1)(16x - 1)}{x^4}$	nnn. $6x^{7/2} - x^{5/2} - 15x^{3/2}$ $= x\sqrt{x} \times (3x - 5)(2x + 3)$

Name: _____ Date: _____

Pre – Calculus Review

2. Simplify **without using a calculator**. Your answers should contain only positive, whole number exponents.

Developing	Proficient	Extending
a. $4a^3b^2 \times 3a^{-4}b^{-3}$ $= \frac{12}{ab}$	b. $\left(\frac{x^{1/2}y^{-2}}{x^2y^{1/2}}\right)^4$ $= \frac{1}{x^6y^{10}}$	c. $\frac{(x^{-1/2}y^2)^{-5/4}}{x^2y^{1/2}}$ $= \frac{\sqrt[8]{x^5}}{x^2y^3}$
d. $m^4 \times 2m^{-3}$ $= 2m$	e. $ba^4 \times (2b^6a^3)^{-3/2}$ $= \frac{\sqrt{2a}}{4ab^8}$	f. $\frac{(x^3y^2)^{3/2}}{(x^{-1}y^{-2/3})^{1/4}}$ $= x^4y^3 \times \sqrt[12]{x^9y^2}$
g. $\frac{a^3}{a^5} \times a^{-2}$ $= \frac{1}{a^4}$	h. $2y^{5/2} \times 3y^{-3}$ $= \frac{6 \times \sqrt{y}}{y}$	i. $\frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$ $= \frac{2x^2}{3yz^7}$
j. $(2x^4y^{-3})^{-1}$ $= \frac{y^3}{2x^4}$	k. $(m \times m^{-2} \times n^{5/3})^2$ $= \frac{n^3 \times \sqrt[3]{n}}{m^2}$	l. $\frac{(20a^2b^5)^{-1/2}}{2ab^3}$ $= \frac{\sqrt{5b}}{20a^2b^6}$
m. $\left(\frac{x^2y}{y^{-2}}\right)^{-2}$ $= \frac{1}{x^4y^6}$	n. $\frac{(2x^{-3}z^2)^3}{x^3y^4z^2 \times x^{-4}z^3}$ $= \frac{8z}{x^8y^4}$	o. $\frac{(32pm^{-1})^{-1/4} \times 2m^{-1}p^3}{2pq^2}$ $= \frac{p \times \sqrt[4]{8mp^3}}{4mq^2}$
p. $2x^3y^{-3} \times 2x^{-1}y^3$ $= 4x^2$	q. $4v^3 \times v^{-1/3}u^{-2}$ $= \frac{4v^2 \times \sqrt[3]{v^2}}{u}$	
r. $\frac{2y^3 \times 3xy^3}{3x^2y^4}$ $= \frac{2y^2}{x}$	s. $(n^4)^{-1/3} \times 2n^{-1}$ $= \frac{2 \times \sqrt[3]{n^2}}{n^3}$	

Name: _____ Date: _____

Pre – Calculus Review

3. Solve the following inequalities. Show each step and include a number line as part of your solution for full credit.

Developing			
a. $5(q-7) < -15$ $q < 4$	b. $2(r+4) \geq 11$ $r \geq \frac{3}{2}$	c. $-3(s-2.7) \leq 1$ $s \geq 2.4$	d. $7.6 > -2(-3-t)$ $t < 0.8$
e. $8.4 < -6(u+2.4)$ $u < -3.8$	f. $2(-3v+1.5) \geq 6$ $v \leq -0.5$	g. $5(w-7.2) \leq 14.5$ $w \leq 10.1$	h. $-8 > 0.4(3.2+x)$ $x < -23.2$
i. $4y > 7-3y$ $y > 7$	j. $-12z < 15-15z$ $z < 5$	k. $-10.8+7a \leq 5a$ $a \leq 5.4$	l. $6b-11.34 > 4.2b$ $b > 6.3$
m. $x^2-2x-3 \leq 0$ $\{x\|-1 \leq x \leq 3, x \in \mathbb{R}\}$	n. $x^2+2x-3 \leq 0$ $\{x\|-3 \leq x \leq 1, x \in \mathbb{R}\}$	o. $x^2-x-12 > 0$ $\{x\|x < -3, x > 4, x \in \mathbb{R}\}$	
p. $-x^2+3x+10 < 0$ $\{x\|x < -2, x > 5, x \in \mathbb{R}\}$	q. $x^2-7x-18 < 0$ $\{x\|-2 < x < 9, x \in \mathbb{R}\}$	r. $x^2-5x-14 \leq 0$ $\{x\|-2 \leq x \leq 7, x \in \mathbb{R}\}$	
s. $x^2-9x+8 \geq 0$ $\{x\|x \leq 1, x \geq 8, x \in \mathbb{R}\}$	t. $x^2-16x+63 > 0$ $\{x\|x < 7, x > 9, x \in \mathbb{R}\}$	u. $x^2-25 \geq 0$ $\{x\|x \leq -5, x \geq 5, x \in \mathbb{R}\}$	
v. $x^2-13x+36 < 0$ $\{x\|4 < x < 9, x \in \mathbb{R}\}$	w. $x^2+3x-18 > 0$ $\{x\|x < -6, x > 3, x \in \mathbb{R}\}$	x. $x^2+4x-21 \leq 0$ $\{x\|-7 \leq x \leq 3, x \in \mathbb{R}\}$	
Proficient			
y. $7x^2-31x-20 \leq 0$ $\left\{x\middle\|-\frac{4}{7} \leq x \leq 5, x \in \mathbb{R}\right\}$	z. $7x^2+9x < 0$ $\left\{x\middle\|-\frac{9}{7} < x < 0, x \in \mathbb{R}\right\}$	aa. $7x^2-45x-28 > 0$ $\left\{x\middle\|x < -\frac{4}{7}, x > 7, x \in \mathbb{R}\right\}$	
bb. $2x^2+17x+21 < 0$ $\left\{x\middle\|-7 < x < \frac{3}{2}, x \in \mathbb{R}\right\}$	cc. $5x^2-x-18 \leq 0$ $\left\{x\middle\|-\frac{9}{5} \leq x \leq 2, x \in \mathbb{R}\right\}$	dd. $3x^2-5x+2 > 0$ $\left\{x\middle\|\frac{2}{3} < x < 1, x \in \mathbb{R}\right\}$	
ee. $7x^2 > 32x+60$ $\left\{x\middle\|x < -\frac{10}{7}, x > 6, x \in \mathbb{R}\right\}$	ff. $4x^2+30 \leq -43x$ $\left\{x\middle\|-10 \leq x \leq \frac{3}{4}, x \in \mathbb{R}\right\}$	gg. $9 < 10x^2+89x$ $\left\{x\middle\|x < 9, x > \frac{1}{10}, x \in \mathbb{R}\right\}$	
hh. $9x^2 > 16$ $\left\{x\middle\|x < -\frac{4}{3}, x > \frac{4}{3}, x \in \mathbb{R}\right\}$	ii. $8x^2 > 10x+3$ $\left\{x\middle\|x < -\frac{1}{4}, x > \frac{3}{2}, x \in \mathbb{R}\right\}$	jj. $32x^2 \leq 128$ $\{x\|-2 \leq x \leq 2, x \in \mathbb{R}\}$	

Name: _____ Date: _____

Pre – Calculus Review

4. Determine the exact values of the following trigonometric ratios. Include a diagram with your solution.

Developing		
a. $\cos 330°$ $= \frac{\sqrt{3}}{2}$	b. $\sin 240°$ $= -\frac{\sqrt{3}}{2}$	c. $\tan 135°$ $= -1$
d. $\cot(-120°)$ $= \frac{\sqrt{3}}{3}$	e. $\csc(-330°)$ $= 2$	f. $\sec 315°$ $= \sqrt{2}$
g. $\cos\left(-\frac{5\pi}{3}\right)$ $= \frac{1}{2}$	h. $\sin\left(\frac{5\pi}{4}\right)$ $= -\frac{\sqrt{2}}{2}$	i. $\tan\left(\frac{5\pi}{6}\right)$ $= -\frac{\sqrt{3}}{3}$
j. $\sec\left(\frac{\pi}{6}\right)$ $= \frac{2\sqrt{3}}{3}$	k. $\cot\left(-\frac{4\pi}{3}\right)$ $= -\frac{\sqrt{3}}{3}$	l. $\csc\left(\frac{15\pi}{4}\right)$ $= -\sqrt{2}$

5. For the following coordinates on the terminal arm of an angle θ, find the exact value of all six trigonometric ratios.

Developing		
a. $A(4,7)$	b. $J(-8,-3)$	c. $C(5,-8)$
$\sin\theta = \frac{7\sqrt{65}}{65}$	$\sin\theta = -\frac{3\sqrt{73}}{73}$	$\sin\theta = -\frac{8\sqrt{89}}{89}$
$\cos\theta = \frac{4\sqrt{65}}{65}$	$\cos\theta = -\frac{8\sqrt{73}}{73}$	$\cos\theta = \frac{5\sqrt{89}}{89}$
$\tan\theta = \frac{7}{4}$	$\tan\theta = \frac{3}{8}$	$\tan\theta = -\frac{8}{5}$
$\csc\theta = \frac{\sqrt{65}}{7}$	$\csc\theta = -\frac{\sqrt{73}}{3}$	$\csc\theta = -\frac{\sqrt{89}}{8}$
$\sec\theta = \frac{\sqrt{65}}{4}$	$\sec\theta = -\frac{\sqrt{73}}{8}$	$\sec\theta = \frac{\sqrt{89}}{5}$
$\cot\theta = \frac{4}{7}$	$\cot\theta = \frac{8}{3}$	$\cot\theta = -\frac{5}{8}$

Name: _____ Date: _____

Pre – Calculus Review

d. $D(-4,8)$ $\sin\theta = \frac{2\sqrt{5}}{5}$ $\cos\theta = -\frac{\sqrt{5}}{5}$ $\tan\theta = -2$ $\csc\theta = \frac{\sqrt{5}}{2}$ $\sec\theta = -\sqrt{5}$ $\cot\theta = -\frac{1}{2}$	e. $F(-2,4)$ $\sin\theta = \frac{2\sqrt{5}}{5}$ $\cos\theta = -\frac{\sqrt{5}}{5}$ $\tan\theta = -2$ $\csc\theta = \frac{\sqrt{5}}{2}$ $\sec\theta = -\sqrt{5}$ $\cot\theta = -\frac{1}{2}$	f. $G(-9,3)$ $\sin\theta = \frac{\sqrt{10}}{10}$ $\cos\theta = -\frac{3\sqrt{10}}{10}$ $\tan\theta = -\frac{1}{3}$ $\csc\theta = \sqrt{10}$ $\sec\theta = -\frac{\sqrt{10}}{3}$ $\cot\theta = -3$

6. Solve the following trigonometric equation on the specified domain for exact value(s) of θ

Proficient		
a. $4\csc\theta - 5 = 3$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{\pi}{6}$ $\theta_2 = \frac{5\pi}{6}$	b. $\sin\theta = \sqrt{3} - \sin\theta$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{\pi}{3}$ $\theta_2 = \frac{2\pi}{3}$	c. $1 + \cos\theta = 1 - \cos\theta$ $-2\pi \le \theta < 0$ $\theta_1 = -\frac{\pi}{2}$ $\theta_2 = -\frac{3\pi}{2}$
d. $\tan\theta = \sqrt{3} - 2\tan\theta$ $-\pi \le \theta < \pi$ $\theta_1 = \frac{\pi}{6}$ $\theta_2 = -\frac{5\pi}{6}$	e. $\sqrt{3}\sec\theta - 2 = 0$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{\pi}{6}$ $\theta_2 = \frac{11\pi}{6}$	f. $3\csc\theta - 6 = 0$ $-\pi \le \theta < \pi$ $\theta_1 = \frac{\pi}{6}$ $\theta_2 = \frac{5\pi}{6}$
Extending		
g. $2\sin^2\theta = 1$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{\pi}{4}$ $\theta_2 = \frac{3\pi}{4}$ $\theta_3 = \frac{5\pi}{4}$ $\theta_4 = \frac{7\pi}{4}$	h. $2\sin^2\theta + \sin\theta = 1$ $-2\pi \le \theta < 0$ $\theta_1 = -\frac{7\pi}{6}$ $\theta_2 = -\frac{\pi}{2}$ $\theta_3 = -\frac{11\pi}{6}$	i. $2\cos^2\theta + \cos\theta - 1 = 0$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{\pi}{3}$ $\theta_2 = \pi$ $\theta_3 = \frac{5\pi}{3}$

Name: _____ Date: _____

Pre – Calculus Review

j. $2\cos^2\theta + 3\cos\theta + 1 = 0$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{2\pi}{3}$ $\theta_2 = \pi$ $\theta_3 = \frac{4\pi}{3}$	k. $4\sin^2\theta - 1 = 0$ $0 \le \theta < 2\pi$ $\theta_1 = \frac{\pi}{6}$ $\theta_2 = \frac{7\pi}{6}$ $\theta_3 = \frac{5\pi}{6}$ $\theta_4 = \frac{11\pi}{6}$	l. $\sec^2\theta + 3\sec\theta = -2$ $0 \le \theta < 2\pi$ $\theta_1 = \pi$ $\theta_2 = \frac{2\pi}{3}$ $\theta_3 = \frac{4\pi}{3}$

7. Solve showing all steps. State an exact answer then estimate where applicable. State any restrictions on the domain and check for extraneous roots.

Developing	
a. $3^{x+5} = 27$ $x \in \mathbb{R}$ $x = -2$	b. $3^{2x-1} = 9$ $x \in \mathbb{R}$ $x = \frac{3}{2}$
c. $9^{x+5} = 27^{-2x}$ $x \in \mathbb{R}$ $x = -\frac{5}{4}$	d. $16^{2x-5} = 32$ $x \in \mathbb{R}$ $x = \frac{25}{8}$
e. $\left(\frac{1}{3}\right)^x = 27^{x-1}$ $x \in \mathbb{R}$ $x = \frac{3}{4}$	f. $\sqrt{8} = 64^x$ $x \in \mathbb{R}$ $x = \frac{1}{4}$
g. $\frac{1}{49} = 7^{x-1}$ $x \in \mathbb{R}$ $x = -1$	h. $\sqrt{8} = 64^x$ $x \in \mathbb{R}$ $x = \frac{1}{4}$
i. $2^x = 9$ $x \in \mathbb{R}$ $x = \log_2 9$	j. $5 \times 3^x = 135$ $x \in \mathbb{R}$ $x = 3$
Proficient	
k. $2^x = 3^{x-1}$ $x \in \mathbb{R}$ $x = \frac{\log 3}{\log(3/2)}$	l. $6^x = 10^x$ $x \in \mathbb{R}$ $x = 0$
m. $5^x = 2(3^x)$ $x \in \mathbb{R}$ $x = \frac{\log 2}{\log(5/3)}$	n. $5^x = 7^{x-2}$ $x \in \mathbb{R}$ $x = \frac{\log 49}{\log(7/5)}$
o. $64^{4x} = 16^{x+5}$ $x \in \mathbb{R}$ $x = 1$	p. $9^{x-7} = 27^{2x-9}$ $x \in \mathbb{R}$ $x = \frac{13}{4}$

Name: _____ Date: _____

Pre – Calculus Review

q. $125^{6x+2} = 25^{8x+1}$ $x \in \mathbb{R}$ $x = -2$	r. $8^{x+2} = \left(\frac{1}{4}\right)^{x+3}$ $x \in \mathbb{R}$ $x = \frac{\log 49}{\log\left({}^{7}/_{5}\right)}$
s. $12^{3x} = 1000$ $x \in \mathbb{R}$ $x = \log_{1728} 1000$	t. $7^{x+2} = 441$ $x \in \mathbb{R}$ $x = \log_7 441 - 2$
Extending	
u. $3(5^x) = 6^{x-1}$ $x \in \mathbb{R}$ $x = \frac{\log 18}{\log\left({}^{6}/_{5}\right)}$	v. $2(6^x) = 5^{x+1}$ $x \in \mathbb{R}$ $x = \frac{\log\left({}^{5}/_{2}\right)}{\log\left({}^{6}/_{5}\right)}$
w. $3^{2x} = 7^{x+1}$ $x \in \mathbb{R}$ $x = \frac{\log 7}{\log\left({}^{9}/_{7}\right)}$	x. $2(6^x) = 5^{x+1}$ $x \in \mathbb{R}$ $x = \frac{\log\left({}^{5}/_{2}\right)}{\log\left({}^{6}/_{5}\right)}$
y. $3^{{}^{2x}/_{3}} = 350$ $x \in \mathbb{R}$ $x = \log_7\left(1750\sqrt{14}\right)$	z. $2(6^{x+2}) = 3^{2x-3=}$ $x \in \mathbb{R}$ $x = \log_{{}^{3}/_{2}}\left(\frac{8}{3}\right)$

8. Solve showing all steps. State an exact answer then estimate where applicable. State any restrictions on the domain and check for extraneous roots.

Developing	
a. $\log_4(5x+1) = \log_4(x+17)$ $x > -\frac{1}{5}$ $x = 4$	b. $\log_4 x = 5$ $x > 0$ $x = 1024$
c. $\log_5 x + 6 = 2$ $x > 0$ $x = \frac{1}{625}$	d. $2\log_2 x = 10$ $x > 0$ $x = 32$
e. $\log_6(x+3) + 2 = 5$ $x > -3$ $x = 213$	f. $3\log_5 x = \log_5 125$ $x > 0$ $x = 5$
Proficient	
g. $2\log_2(x-5) = 6$ $x > 5$ $x = 13$	h. $3\log_5 x = \log_5 125$ $x > 0$ $x = 5$
i. $3\log_6 x = \log_6 9 + \log_6 24$ $x > 0$ $x = 6$	j. $3\log_5 x = \log_5 125$ $x > 0$ $x = 5$
k. $\log_2 x^2 - \log_2 5 = \log_2 20$ $x > 0$ $x = 10$	l. $\log_4 x + 2\log_4 x = 6$ $x > 0$ $x = 16$

Name: _____ Date: _____

Pre – Calculus Review

m. $5\log_3 x - \log_3 x = 8$ $x > 0$ $x = 9$	n. $\log_3(4x + 9) = 5$ $x > -\frac{9}{4}$ $x = \frac{117}{2}$
Extending	
o. $\log_2(x + 1) + \log_2 x = \log_2 5$ $x > 0$ $x = \frac{-1 + \sqrt{21}}{2}$	p. $\log(x + 5) + \log x = \log 2$ $x > 0$ $x = \frac{-5 + \sqrt{33}}{2}$
q. $\log(x + 3) + \log(x - 5) = 1$ $x > 5$ $1 + \sqrt{26}$	r. $\log(x - 4) + \log x = \log 0.1$ $x > 4$ $x = \frac{20 + \sqrt{410}}{10}$
s. $\log x + \log(x + 1) = \log 3$ $x > 0$ $x = \frac{-1 + \sqrt{13}}{2}$	t. $\log x + \log(x + 3) = \log 8$ $x > 0$ $x = \frac{-3 + \sqrt{41}}{2}$
u. $\log(5x) - \log(x - 1) = 1$ $x > 1$ $x = 2$	v. $\log_8(6x + 2) + \log_8(x - 3) = 2$ $x > 3$ $x = 5$
w. $\log_6(x - 3) + \log_6(x + 6) = 2$ $x > 3$ $x = 6$	x. $\log_2(4x + 10) - \log_2 x = 3$ $x > 0$ $x = \frac{5}{2}$
y. $\log(2x + 6) = 1 + \log(x - 1)$ $x > 1$ $x = 2$	z. $\log_4(x - 4) + \log_4(x + 2) = 2$ $x > 4$ $x = 6$