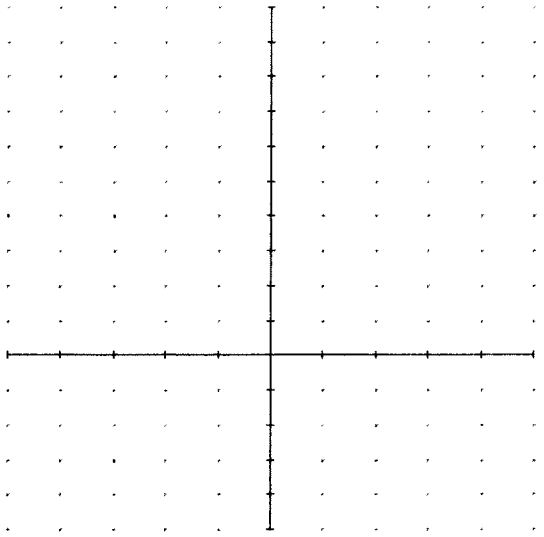
PAST Test #4

Directions: Please show all your work since partial credit is given. Answers without the necessary work will receive no credit. And remember, have fun!

1. Sketch a graph of $Q(x) = -2(x+1)^2 + 8$. Make sure to find and label all the required points on your graph.



a) Vertex: _____ (a) (-1, 8)

b) Axis of Symmetry: _____ (b) $x = -1$

c) y-intercept: _____ (c) (0, 6)

d) x-intercept(s): _____ (d) (-3, 0) (1, 0)

e) zeros: _____ (e) $x = -3$ or 1

f) Domain: _____ (f) $\mathbb{R}$

g) Range: _____ (g) $\{y \mid y \leq 8\}$

h) Max/Min Value: _____ (h) $y = 8$

2. A less popular super hero, Super Frog, takes off from the ground. His trajectory is given by the equation $h(t) = 28t - 4t^2$, where h is his height in feet after t seconds.

a) After how long does Super Frog reach a maximum height? _____ (a) 3.5 sec

b) What is his maximum height? _____ (b) 49 ft.

3. Given $h(x) = 3x + 5$ and $p(x) = 2x^2 - 7x - 1$, evaluate the following:.

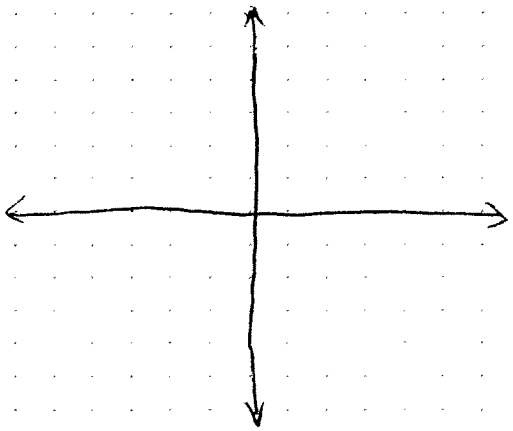
a) $(h \circ p)(-1) =$ _____ (a) 29

b) $p(h(x)) =$ _____ (b) $18x^2 + 39x + 14$

c) $(p - h)(x) =$ _____ (c) $2x^2 - 10x - 5$

d) $\left(\frac{h}{p}\right)(0) =$ _____ (d) -5

4. Sketch the graph of $V(x) = (x-2)^3 - 1$ as a translation of a toolkit function. Please label at least three points on your graph.



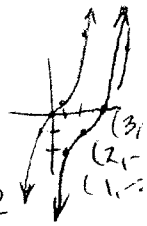
Horizontal: _____

Vertical: _____

$y = x^3$

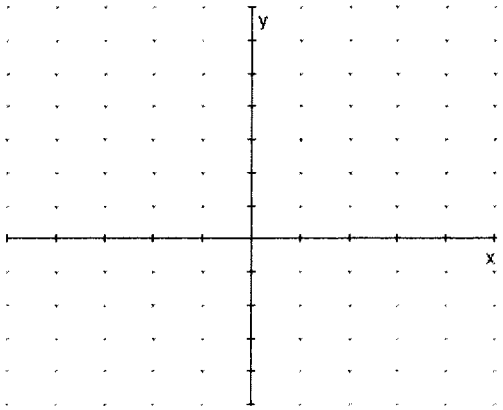
right 2

down 1



5. Let $f(x) = 2^{x+1} - 3$.

a) Sketch a graph of $f(x)$. Please label at least three points on your graph.



x	y
-2	$\frac{1}{2} - 3 = -2.5$
-1	$1 - 3 = -2$
0	$2 - 3 = -1$
1	$4 - 3 = 1$
2	$8 - 3 = 5$

(Graph)

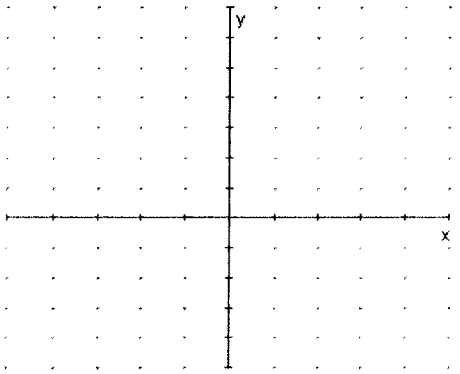
b) Is $f(x)$ one-to-one? Justify your answer. **YES / NO** (circle one)

yes. HLT

c) Does $f(x)$ have an inverse? Justify your answer. **YES / NO** (circle one)

yes. 1-to-1

6. Let $f(x) = \log_3(x-2)$. Sketch a graph of $f(x)$. Label at least three points.



$y = \log_3(x-2) \rightarrow 3^y = x - 2$

$3^y + 2 = x$

x	y
	-2
	-1
	0
	1
	2

7. Evaluate $\log_5 625$ _____

8. Solve $\ln x = -3$ _____

9. Expand $\log\left(\frac{10u^4}{v^5}\right)$ _____

10. Contract $2(\ln x + \ln y)$ _____

11. Solve

a) $25^{x-2} = 125^x$

b) $7^{x-2} = 12$ round to nearest ten-thousandth

c) $\log(x-5) = 2$

d) $\log_3(x^2 - 6x) = 3$

12. Let the functions f and g be defined by the tables below. Evaluate the following compositions.

x	$f(x)$
-3	0
-2	2
-1	-3
0	5

x	$g(x)$
-3	7
0	-2
1	3
2	-4

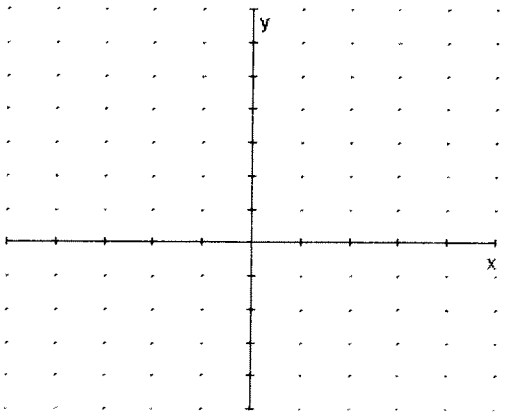
a) $f(g(0)) =$ _____

b) $g(f(-1)) =$ _____

c) $f(f(-3)) =$ _____

d) $g(f(0)) =$ _____

13. Graph the solution set of $3x + 6y < 12$.



14. Find the equation of the line that goes through $(7,-2)$ and $(6,3)$.

15. Find the equation of the line that goes through $(-5,2)$ and $(-3,1)$.

(7) 4

(8) $e^{-3} = \frac{1}{e^3}$

(9) $1 + 4\log u - 5\log$

(10) $\ln(x^2y^2)$

(11) (a) $x = -4$

(b) $x = \frac{\ln 12}{\ln 7} + 2 \approx$

(c) $x = 105$

(d) $x = 9$ or -3

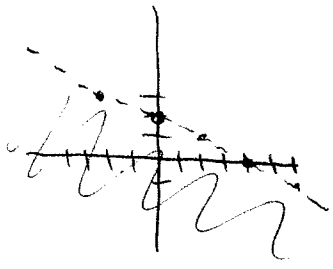
(a) 2

(b) 7

(c) 5

(d) undefined

$y < -\frac{1}{2}x + 2$



$y = 5x - 27$

$y = -\frac{1}{2}x - \frac{1}{2}$

16. Solve

a) $|6x+2|>4$

b) $4z+2 \le z+6$ and $-2z-4<2$

c) $\dfrac{9}{x^2+7x+10}=\dfrac{5}{x+2}-\dfrac{3}{x+5}$

d) $y(3y-2)=8$

e) $\sqrt[3]{4z^2-9z-6}=-2$

f) $t+\sqrt{7-3t}=1$

g) $\left(y+\dfrac{3}{5}\right)^2+12=0$

h) $8m-11=(m-4)(m-2)$

i) $t^2(t-2)=8t$

j) $\begin{aligned}2x+5y&=4\\3x+6y&=-3\end{aligned}$

k) $\begin{aligned}x-4y&=7\\x&=-3+4y\end{aligned}$

l) $3v^2-8v+2=0$

m) $\dfrac{t}{t-2}+\dfrac{2}{t-1}=4$

(a) $\{x \mid -1<x<3\}$

(b) $\{z \mid -3<z\le\frac{4}{3}\}$

(c) $\varnothing$

(d) $\{-\frac{4}{3}, 2\}$

(e) $z=\frac{1}{4}$ or -2

(f) $t=-3$ ~~or $t=6$~~

(g) $y=-\frac{3}{5}\pm 2i\sqrt{3}$

(h) $7\pm\sqrt{30}=m$

(i) $\{0,-2,4\}$

(j) $(-13,6)$

(k) $\varnothing$

(l) $v=\dfrac{4\pm\sqrt{10}}{3}$

(m) $\{3, \frac{4}{3}\}$