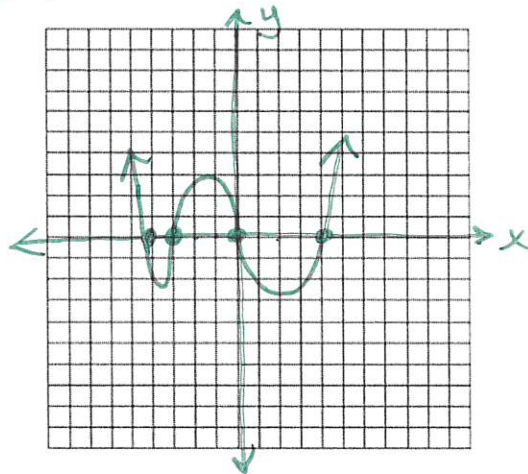


Graph

- Exponential
- Log
- Trig graph
- Transformations
- Higher order polynomials



1. The zeros of a quartic polynomial function h are $-3, 0,$ and ± 4 . Sketch a graph of $y = h(x)$ on the grid.



2. The x -value of which function's x -intercept is larger, f or h ? Justify your answer.

$$f(x) = \log(x - 4)$$

x-intercept (5.0)

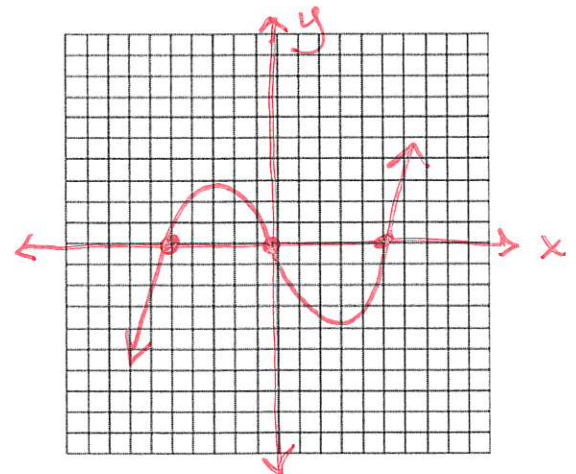
x	h(x)
-1	6
0	4
1	2
2	0
3	-2

x-int. →

$f(x)$ has a larger x-intercept because $5 > 2$

3. Sketch a graph that has the following characteristics:

- three real zeros
- as $x \rightarrow -\infty, f(x) \rightarrow -\infty$
- as $x \rightarrow \infty, f(x) \rightarrow \infty$



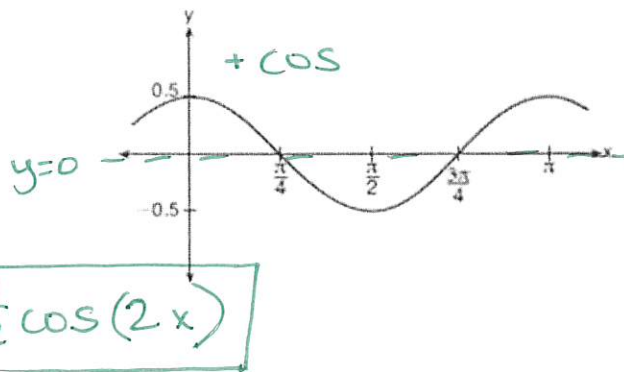
4. Write an equation for the function shown.

$$A = \text{amp} = \frac{1}{2}$$

$$B = \text{freq} = \frac{2\pi}{\text{per}} = \frac{2\pi}{\pi} = 2$$

$$\text{Per} = \pi$$

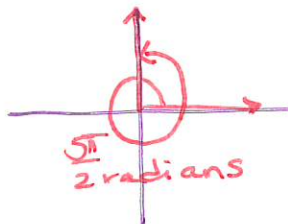
*no H/S



$$y = \frac{1}{2} \cos(2x)$$

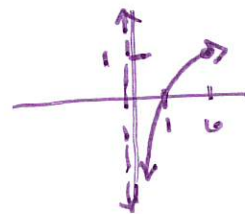
5. Sketch an angle that measures $\frac{5\pi}{2}$ radians in standard position.

$$\frac{5(180)}{2} = 450^\circ$$



6. Which statement about the graph of $c(x) = \log_6 x$ is FALSE?

- a. The asymptote has the equation of $y = 0$. *Asymptote: $x = 0$*
- b. The graph has no y-intercept. *True*
- c. The domain is the set of positive reals. *True*
- d. The range is the set of all real numbers. *True*



7. Write an equation in standard form for the function shown.

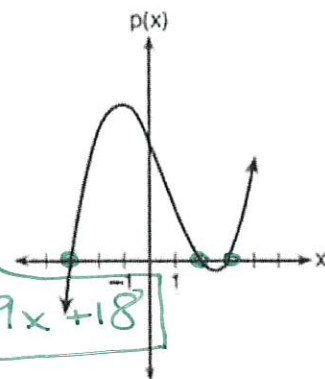
a (+)

$$x = -3 \quad x = 2 \quad x = 3$$

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

$$y = (x-2)(x^2-9)$$

$$y = x^3 - 2x^2 - 9x + 18$$



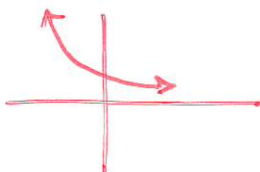
8. Which function represents exponential decay?

a. $y = 4^{-x}$

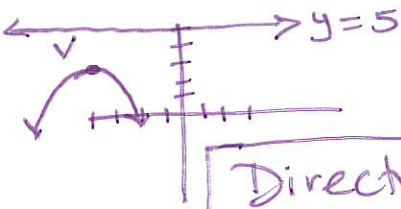
b. $y = \left(\frac{2}{3}\right)^{-x}$

c. $y = 2.3^{2x}$

d. $y = 3^{0.2x}$



9. What is the equation of the directrix for $-8(y - 3) = (x + 4)^2$?



Directrix: $y = 5$

$$y - 3 = -\frac{1}{8}(x + 4)^2$$

$$y = -\frac{1}{8}(x + 4)^2 + 3$$

$a \ominus, p = 2, V(-4, 3)$

10. Given $2^x = 11 - 2x$, solve for x , to the nearest tenth, graphically.

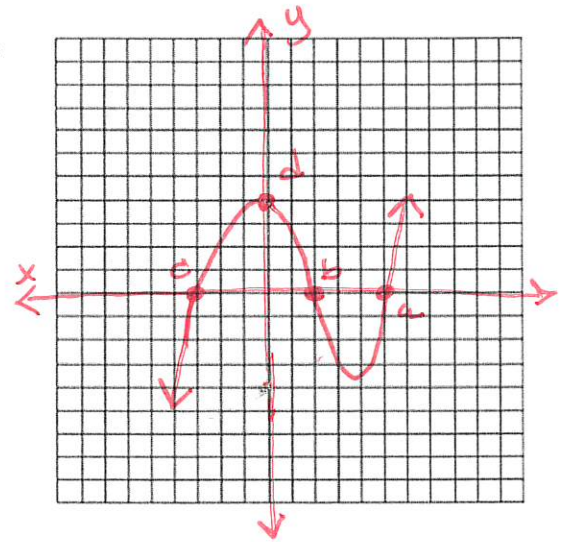
2nd TRACE 5

$$x = 2.557\dots$$

$x = 2.6$

11. Sketch a possible function $p(x) = (x - a)(x - b)(x + c)$, where a, b, c are positive, $a > b$, and $p(x)$ has a positive y -intercept of d . Label all intercepts.

$a = 5$
 $b = 2$
 $c = -3$
 $d = 4$

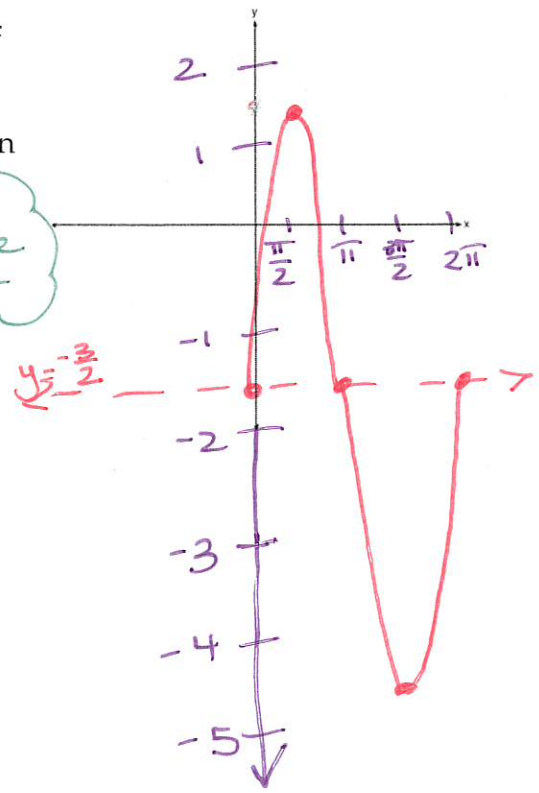


12. Sketch at least 1 cycle of a sine curve with an amplitude of 3, a midline of $y = -3/2$, and a period of 2π . Explain any differences between $y = 3 \sin(x - \frac{\pi}{3}) - \frac{3}{2}$ and the sketch in part a.

$A = 3$
 $Per = 2\pi$
 $B = 1$
 $D = -\frac{3}{2}$

$$y = 3 \sin x - \frac{3}{2}$$

This is shifted $\frac{\pi}{3}$ units to the Right



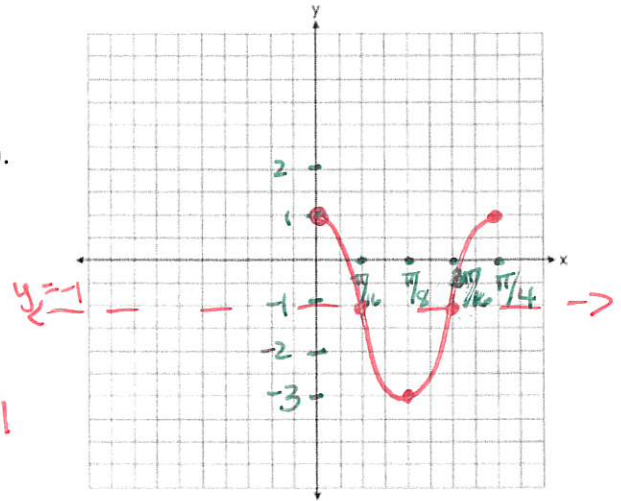
13. On the axes below, graph one cycle of a cosine functions with an amplitude of 2, a period of $\frac{\pi}{4}$, a midline of $y = -1$, and passing through the point $(0,1)$.

$$A = 2$$

$$B = \frac{2\pi}{\text{per}} = \frac{2\pi}{\pi/4} = 8$$

$$D = -1$$

$$y = 2\cos(8x) - 1$$



14. Given $y = 2.5(1 - 2.7^{-.10x})$. Which equation is NOT equivalent?

a. $y = 2.5 - 2.5(2.7^{-.10x})$ (Distribute)

b. $y = 2.5 - 2.5((2.7)^2)^{-.05x}$ (Power to Power - multiply)

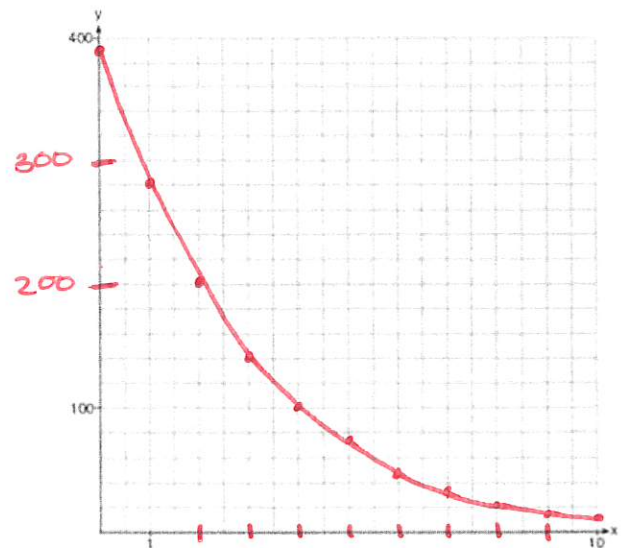
c. $y = 2.5 - 2.5\left(\frac{1}{2.7^{.10x}}\right)^1$ (negative Exponent \rightarrow reciprocal)

d. $y = 2.5 - 2.5(2.7)^{-2}(2.7^{.05x})$

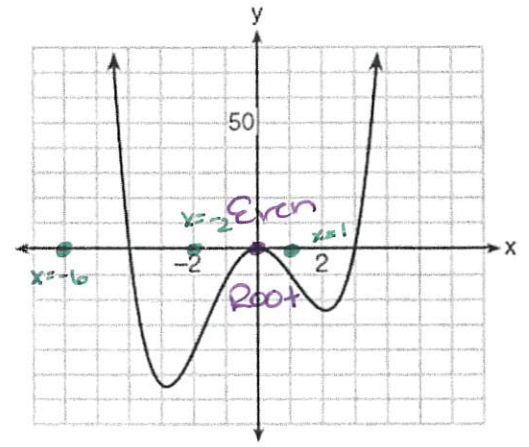
$$-2 + .05x \neq -.10x$$

15. Graph $y = 400(.85)^{2x} - 6$ on the set of axes.

x	y
0	394
1	283
2	202.8...
3	144.8...
4	102.9...
5	72.7...
6	50.8...
7	35.1...
8	23.7...
9	15.4...
10	9.5...



16. The graph of $y = f(x)$ is shown. The function has a leading coefficient of 1. Write an equation for $f(x)$. The function g is formed by translating function f left 2 units. Write an equation for $g(x)$.



$$x = -4 \quad x = 0 \quad x = 0 \quad x = 3$$

$$f(x) = x^2(x+4)(x-3)$$

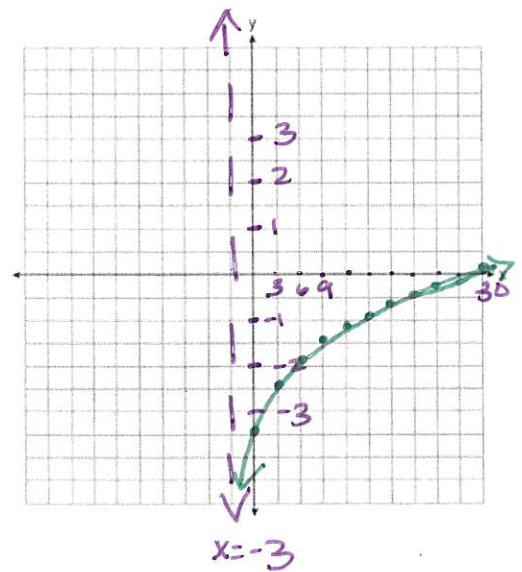
$$g(x) = (x+2)^2(x+6)(x-1)$$

17. Graph $y = \log_2(x+3) - 5$ on the set of axes. Use an appropriate scale to include BOTH x and y intercepts. Describe the behavior as x approaches -3 and as x approaches positive infinity.

x	y	x	y
-3	*	15	-0.83...
0	-3.04...	18	-0.60...
3	-2.04...	21	-0.41...
6	-1.8...	24	-0.24...
9	-1.4...	27	-0.09...
12	-1.1...	30	0.04...

As $x \rightarrow -3$,
 $f(x) \rightarrow -\infty$

As $x \rightarrow \infty$
 $f(x) \rightarrow \infty$



18. What is the solution to the system of equations $y = 3x - 2$ and $y = g(x)$, where $g(x)$ is defined by the function below.

- (0, -2)
- (0, -2) and (1, 6)
- (1, 6)
- (1, 1) and (6, 16)

$$x^2 - 4x + 4 = 3x - 2$$

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

$$(x-1) | (x-6) = 0$$

$$x=1 \quad x=6$$

$$y=3-2=1 \quad y=18-2=16$$

$$g(x) = (x-2)^2$$

