

Questions on 2.2 HW? We will be having a quiz Friday on 2.1 & 2.2.

$$(33) f(x) = \frac{\tan x}{\sin x}$$

$$a) \text{ VA: } x = \pi + k,$$
$$k \in \mathbb{Z}$$

or

$$k = \dots, -2, -1, 0, 1, \dots$$

The image shows a TI-SmartView window for a TI-84 Plus calculator. The main window displays a graph of the function $Y_1 = \tan(X)$. The graph shows vertical asymptotes at $x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$ and $x = -\frac{\pi}{2}, -\frac{3\pi}{2}, -\frac{5\pi}{2}, \dots$. Handwritten blue and red annotations include these asymptote equations and domain intervals like $(-\frac{\pi}{2}, \frac{\pi}{2})$ and $(\frac{\pi}{2}, \frac{3\pi}{2})$. A table of values is shown below the graph, and a key press history window is visible on the right.

| X | Y1 |
|--------|--------|
| 0 | ERROR |
| 1.8508 | -2.403 |
| -1.01 | -1.01 |
| -1.53 | 3.5253 |
| 1.0418 | 1.0418 |

Handwritten notes in blue and red ink:

$$\dots, \frac{3\pi}{2}, \frac{\pi}{2}, \frac{5\pi}{2}, \dots$$

$$\frac{\pi}{2} (-3, 1, 5)$$

$$\frac{\pi}{2} (4k+1)$$

$$(4k+1) \frac{\pi}{2} *$$

$$(4k+3) \frac{\pi}{2}$$

left $\rightarrow -\infty$
right $\rightarrow \infty$

Handwritten red text:

k

5
-
4
-
3
-
2
-
1
-
0
-
-1
-
-2

The image displays the TI-SmartView™ software interface for a TI-84 Plus Silver Edition calculator. The interface is divided into several sections:

- Calculator Image:** A virtual representation of the TI-84 Plus Silver Edition calculator is shown on the left side.
- Equation Editor:** The top right section shows the equation $Y_1 = e^{x-2x}$ entered into Plot2.
- Table:** A table with two columns, X and Y1, is displayed below the equation editor. The data points are:

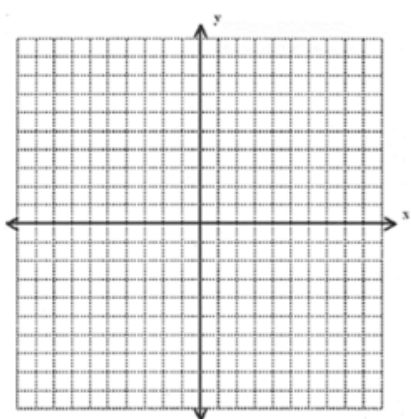
| X | Y1 |
|---|---------|
| 0 | 1 |
| 1 | 0.71828 |
| 2 | 0.38891 |
| 3 | 0.14086 |
| 4 | 0.06588 |
| 5 | 0.03141 |
| 6 | 0.0143 |
- Graph:** A graph window on the right shows the function $y = e^{x-2x}$ plotted. The curve is green for $x < 2$ and blue for $x > 2$. Handwritten labels $-2x$ and e^x are present. A vertical dashed line is drawn at $x = 2$, representing the point of tangency. A smaller graph window is also visible below the table.
- Key Press History:** A section at the bottom right shows the sequence of key presses: 2ND, MODE, CLEAR, STAT PLOT F1, 2ND, LN, LINK, X,T,θ,n, 2, LINK, X,T,θ,n, and GRAPH.

PreCalculus & Limits Review Day

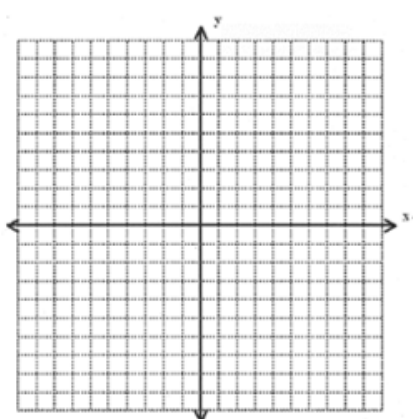
PRECALCULUS

1. Consider the following equations in two variables and sketch the graphs of the equations.

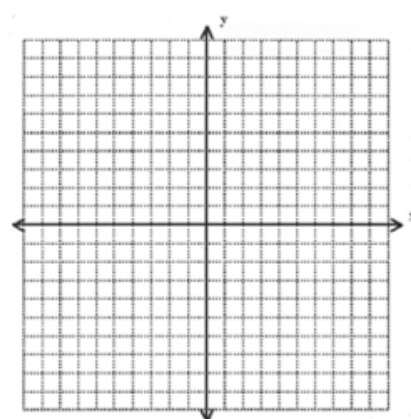
a. $x + y = 0$



b. $x = 5$



c. $y = -2.8$



2. Find the x - and y -intercepts of the following curves.

a. $3.7y - 2.1x = 5.5$

b. $y^2 - 2x = 9$

3. For each of the given lines, determine if the point $\left(-\frac{1}{2}, 3\right)$ lies on the line.

a. $2y - 3x = 5$

b. $2.4x + y - 1.8 = 0$

4. Write an equation of the line that passes through the points $(-6, 3)$ and $(1, 2)$.

5. Write the equation of the line that passes through $(-6, -2)$ and is perpendicular to the line $3y = 5x - 7$.

6. Give the domain of each function. Try to figure it out without using your calculator.

a. $f(x) = \frac{1}{3x}$

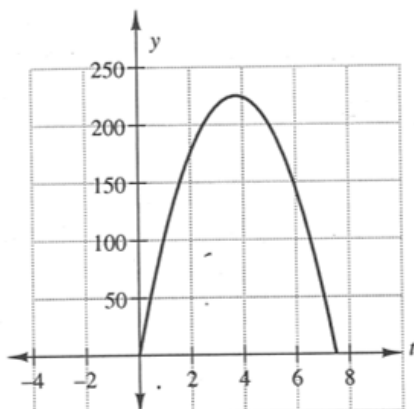
b. $g(t) = \frac{-7}{5t-2}$

c. $F(x) = \sqrt{x} - 5$

d. $G(x) = 1 + \sqrt{x-2}$

7. Give the domain and range of of $F(t) = 3 - \sqrt{t}$.

8. An object is thrown upward. The graph below represents the object's distance y (in feet) from the ground as a function of time t (in seconds).



- a. What are the following values? Describe what they represent.

$$f(0):$$

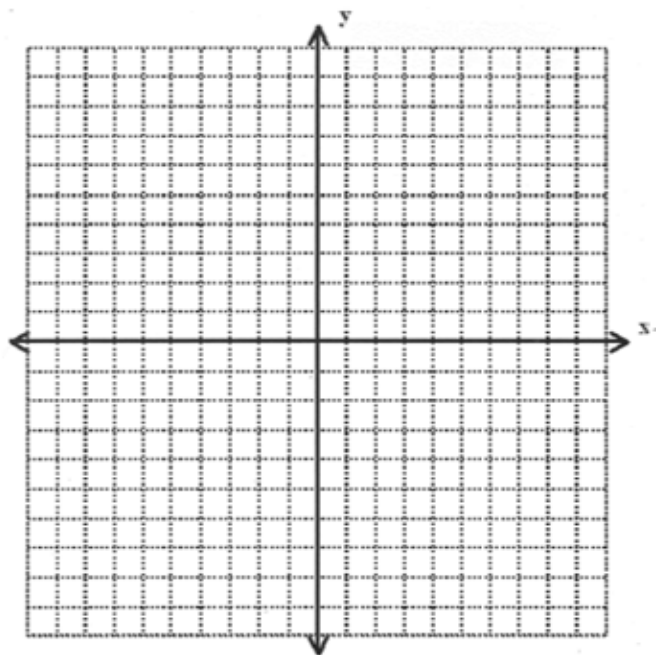
$$f(2.2):$$

$$f(4):$$

- b. Give the approximate value(s) of t at which $f(t) = 0$.
- c. When does the object reach maximum height? How high is the object at that time?
- d. Estimate the time(s) when the object is 150 ft above the ground.

9. Consider the function $f(x) = \begin{cases} -2 & ; x < 0 \\ 3 & ; x = 0 \\ x^2 & ; x > 0 \end{cases}$

a. Sketch the graph of f .



b. Evaluate

$$f(-1.3)$$

$$f(0)$$

$$f\left(\frac{5}{2}\right)$$

$$f(\sqrt{3})$$

10. Simplify

a.
$$\frac{\frac{1}{2x-5} - \frac{7}{8x-20}}{\frac{x}{2x-5}}$$

b.
$$\frac{15 - \frac{2}{x}}{\frac{x}{5} + 4}$$

11. Solve the following quadratic equations by factoring.

a. $64 - x^2 = 0$

b. $2x^2 + 3x = 2$

12. Find all the zeros of $x^4 - 1$.

13. Graph $f(x) = 2x^4 - 4x^3 - x^2 + 3x - 4$ and find one of the roots.

14. Give the amplitude and period of each of the following:

a. $y = 3 \cos(2x)$

b. $-\sin \frac{x}{2}$

c. $5 \tan(2\pi x)$

15. Evaluate the following without a calculator:

a. $\tan^{-1} 1$

b. $\sin^{-1} \frac{\sqrt{3}}{2}$

c. $\cos^{-1} \frac{1}{\sqrt{2}}$

d. $\cos\left(\sin^{-1} \frac{5}{13}\right)$

e. $\sin^{-1}\left(\sin \frac{7\pi}{6}\right)$

16. Simplify without a calculator:

a. $\log_5 25$

b. $\log_3 3^{2x}$

c. $\log_2 \frac{1}{8}$

17. Solve for the variable.

a. $e^{3t} = 100$

b. $2^{x+3} = 7^{2x-1}$

c. $\ln(5z - 2) = 3$

18. The number of bacteria present in a certain culture at time t hours is given by by
 $Q(t) = 2000e^{0.3t}$. If time $t = 0$ corresponds to 8:00 A.M. on a certain day,
- find the number of bacteria present at noon on the same day.
 - Find when there will be 20,000 bacteria present in the culture.

LIMITS

19. If $a \neq 0$, then $\lim_{x \rightarrow a} \frac{x^2 - a^2}{x^4 - a^4}$ is

(A) $\frac{1}{a^2}$

(B) $\frac{1}{2a^2}$

(C) $\frac{1}{6a^2}$

(D) 0

(E) nonexistent

20. Find each of the following limits.

a. $\lim_{x \rightarrow -3} (x^2 + 3x)$

b. $\lim_{x \rightarrow 5\pi/3} \cos x$

c. $\lim_{x \rightarrow 5} \frac{x-5}{x^2-25}$

d. $\lim_{x \rightarrow 4} \frac{\sqrt{x+5}-3}{x-4}$

e. $\lim_{x \rightarrow 0} \frac{\sin x}{5x}$

f. $\lim_{x \rightarrow 4} \frac{x^2 - 5x + 4}{x^2 - 2x - 8}$

Homework

Limits Review WKS