

Unit 2 REVIEW – Functions and Limits

Pre-Calculus

1) Do the following pairs of input and output values represent a function: $(-10, 1)$, $(4, 0)$, $(0, 1)$, $(3, -2)$, and $(4, 3)$? If they don't, give a specific reason why not.

Not a function because 4 is paired with 0 and 3.

2) The hours you stay awake is a function of the number of Monster drinks you have in the evening. Identify the independent and dependent variables.

Indy: # of Monster Drinks
Depend: hours awake

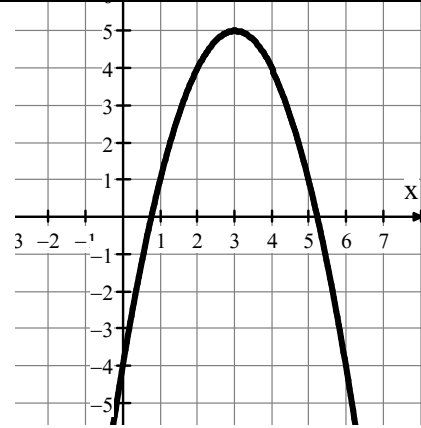
3) Use the graph to the right to approximate the following values to the nearest tenth.

a. $f(5) = 1$

b. $f(0) = -3.5$

c. If $f(x) = 5$, then $x = 3$

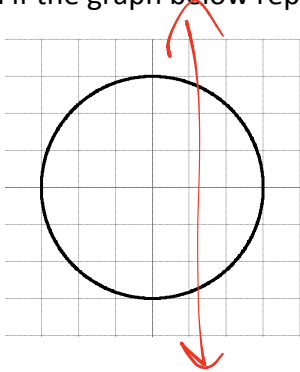
d. If $f(x) = 0$, then the possible value(s) of x are: $0.8, 5.2$



4) If the dependent variable is the number of kilometers you can drive, and the independent variable is the amount of gas (measured in liters) in your car, write a sentence explaining the meaning of $k(20) = 285$.

If you have 20 liters of gas, then you can drive 285 kilometers.

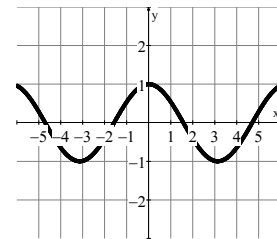
5) Tell if the graph below represents a function.



NOT A FUNCTION

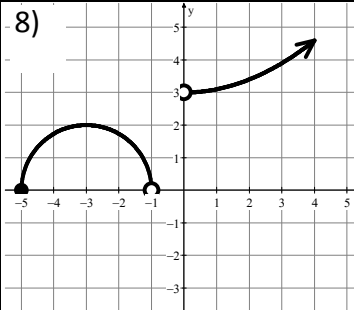
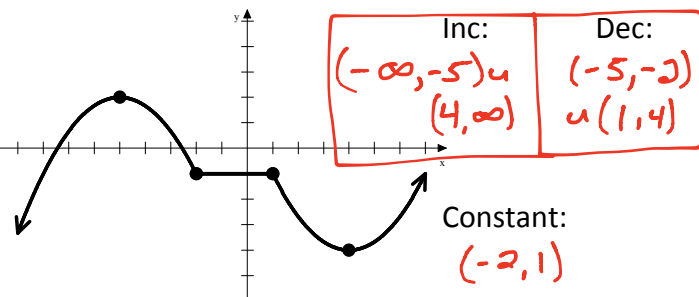
6) Name the basic function shown and write the equation.

Cosine Function



$f(x) = \cos(x)$

7) Identify the domain intervals where each function is increasing, decreasing, and constant. Use interval notation.



Domain: Interval: $[-5, -1) \cup (0, \infty)$

Inequality: $-5 \leq x < -1$ or $x > 0$

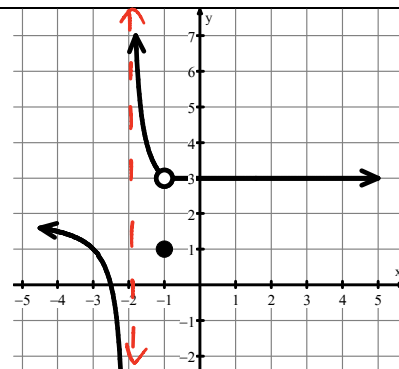
Range: Interval: $[0, 2] \cup (3, \infty)$

Inequality: $0 \leq y \leq 2$ or $y > 3$

9) Identify the x -values of each discontinuity, and write if it is removable or not. If it is nonremovable then classify the type.

Nonremovable
infinite disc. @ $x = -2$

Removable
disc @ $x = -1$



10) Give the value of each statement.

a. $\lim_{x \rightarrow 1^-} f(x) = 2$

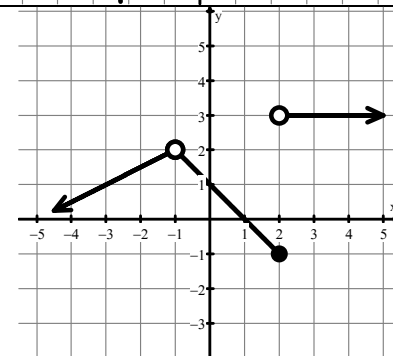
b. $f(2) = -1$

c. $\lim_{x \rightarrow 1^+} f(x) = 0$

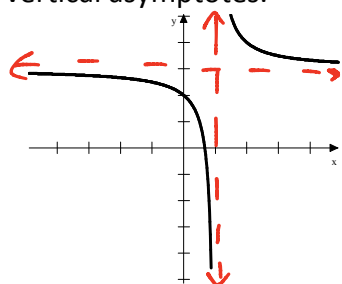
d. $\lim_{x \rightarrow 2^+} f(x) = 3$

e. $f(-1) = \text{DNE}$

f. $\lim_{x \rightarrow 2} f(x) = \text{DNE}$



11) Use limit notation to represent the horizontal and vertical asymptotes.



Horizontal Asymptote:

$\lim_{x \rightarrow \infty} f(x) = 3$ $\lim_{x \rightarrow -\infty} f(x) = 3$

Vertical Asymptote:

$\lim_{x \rightarrow 1^-} f(x) = -\infty$ $\lim_{x \rightarrow 1^+} f(x) = \infty$

12) $G(h)$ represents your numerical grade in precalculus based on the number of hours h you study per day outside of school. Give a relevant domain and range for this function using inequality notation.

Domain: $0 \leq x \leq 8$

Range: $0 \leq y < 100$

13) $f(x) = \frac{2x-3}{x+1}$ has a vertical asymptote at $x = -1$. Create a table of values to determine the behavior of the graph at the vertical asymptote, then use limit notation to explain the behavior. Also, use a graphing calculator to determine the horizontal asymptote.

x	-1.1	-1.01	-1.001	-1	-.999	-.99	-.9
y	52	562	5002	DNE	-4998	-498	-48

END BEHAVIOR

$\lim_{x \rightarrow -1^-} f(x) = \infty$ $\lim_{x \rightarrow -1^+} f(x) = -\infty$

CALCULATOR

HA @ $y = 2$

14) Sketch (freehand) a graph of a function f that satisfies all of the following conditions:

a. $\lim_{x \rightarrow 2} f(x) = -3$

b. $\lim_{x \rightarrow 3^-} f(x) = f(2) = 5$

c. f is increasing on $(-\infty, -3)$

d. $\lim_{x \rightarrow -3^-} f(x) > \lim_{x \rightarrow -3^+} f(x)$

e. f is constant on $(2, \infty)$

