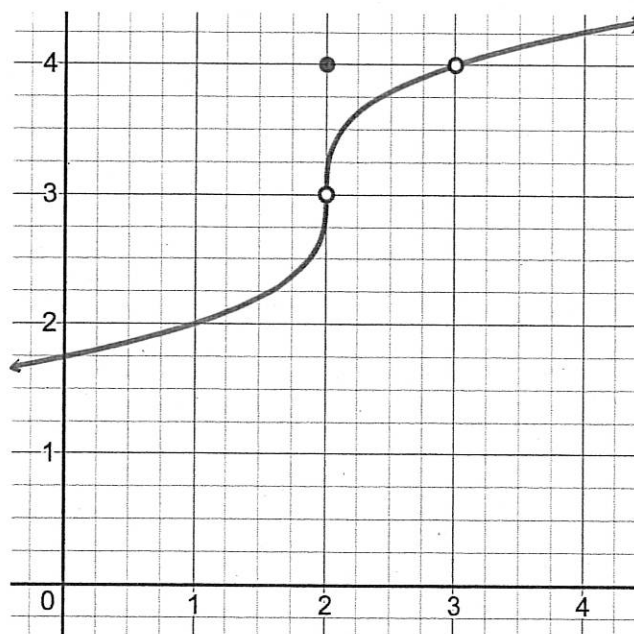


§2.2: DEFINITION OF LIMIT

1.] Given the graph of $f(x)$ below, determine the limits:



Domain: $(-\infty, 2) \cup [3, \infty)$
 Range: $(-\infty, 3) \cup (3, \infty)$

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

b.) $f(1) = 2$

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

d.) $f(2) = 4$

e.) $\lim_{x \rightarrow 3} f(x) = 4$

f.) $f(3) = \text{DNE}$

2.] Let $f(x) = \frac{1 - \cos(x)}{x}$.

a.) What is $f(0)$?

$$f(0) = \frac{1 - \cos(0)}{0} = \frac{1 - 1}{0} = \frac{0}{0} \rightarrow \text{DNE}$$

($x = 0$ is not in domain of f)

b.) Evaluate this limit $\lim_{x \rightarrow 0} f(x)$ using the table below.

x	-0.1	-0.01	-0.001	0	0.001	0.01	0.1
$f(x)$	-0.049	-0.0049	-0.00049	*	0.00049	0.0049	0.049

$$f(-0.1) = \frac{1 - \cos(-0.1)}{-0.1} = -0.049$$

$$f(-0.01) = \frac{1 - \cos(-0.01)}{-0.01} = -0.0049$$

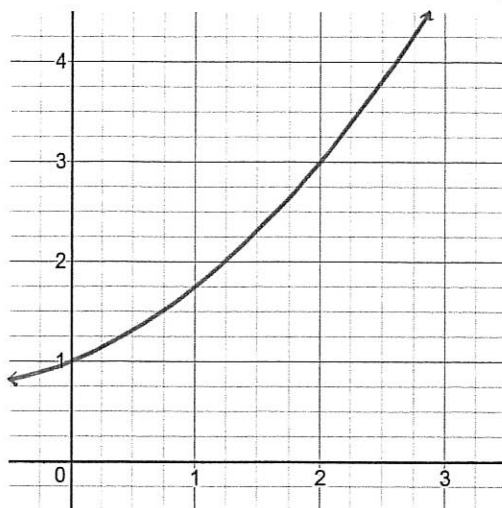
$$f(-0.001) = \frac{1 - \cos(-0.001)}{-0.001} = -0.00049$$

$$f(0.1) = \frac{1 - \cos(0.1)}{0.1} = 0.049$$

$$f(0.01) = \frac{1 - \cos(0.01)}{0.01} = 0.0049$$

$$f(0.001) = \frac{1 - \cos(0.001)}{0.001} = 0.00049$$

3.] Given the graph of $f(x)$ below, determine the limits:



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

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

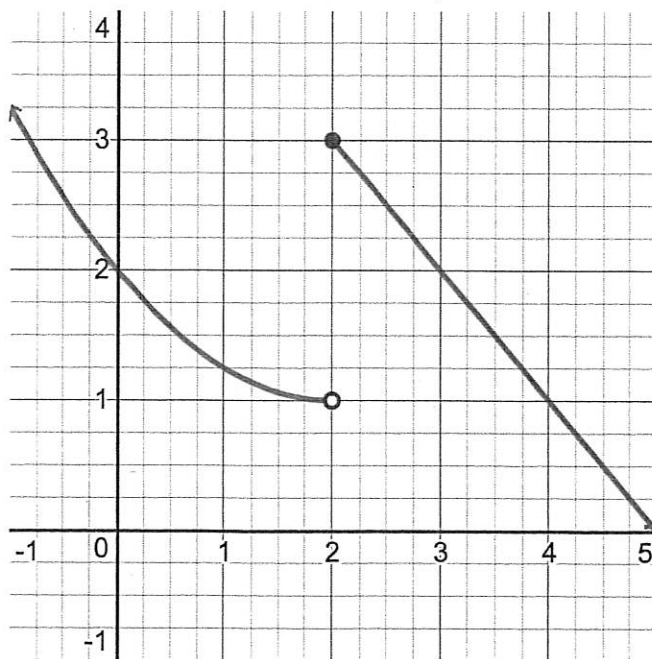
e.) $f(1.9999) \approx 2.9999$

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

d.) $f(2) = 3$

f.) $f(2.0001) \approx 3.0001$

4.] Given the graph of $f(x)$ below, determine the limits:



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

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

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

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

d.) $f(2) = 3$

f.) $f(3) = 2$