

Limits Introduction Homework

1. The graph of $f(x)$ is shown in the figure below. Which of the following statements about $f(x)$ is true?

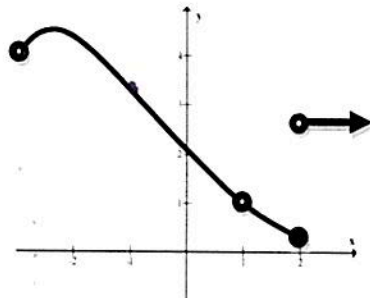
A) $\lim_{x \rightarrow 1} f(x) = DNE$

B) $\lim_{x \rightarrow 2} f(x) = 0.3$

C) $\lim_{x \rightarrow 2.01} f(x) < \lim_{x \rightarrow 2} f(x)$

D) $\lim_{x \rightarrow 1} f(x) \approx 3.3$ ✓

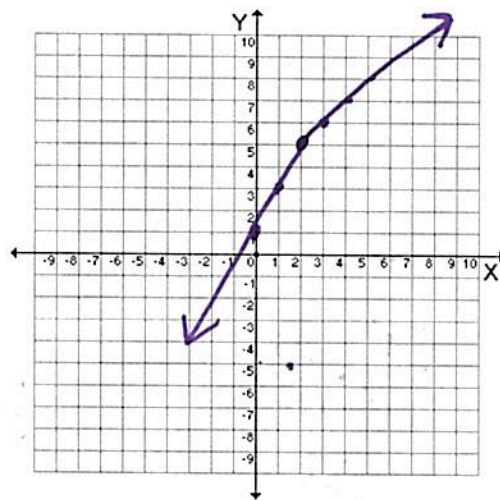
E) $\lim_{x \rightarrow 3} f(x) = 4$



2. Graph the function and find the limit (if it exists) as x approaches 2.

$$f(x) = \begin{cases} 2x+1, & x < 2 \\ x+3, & x \geq 2 \end{cases}$$

$\lim_{x \rightarrow 2} f(x) = 5$



#3-8, Find the limit by direct substitution.

3. $\lim_{x \rightarrow 5} (10 - x^2) = -15$
 $10 - 5^2$

4. $\lim_{x \rightarrow -3} (2x^2 + 4x + 1) = 7$

$2(-3)^2 + 4(-3) + 1$
 $18 + -12 + 1$

5. $\lim_{x \rightarrow \pi} \left(\sin \frac{x}{2} \right) = 1$

$\sin \frac{\pi}{2}$

6. $\lim_{x \rightarrow 3} e^x = e^3$

$$7. \lim_{x \rightarrow \pi} \sec 2x = \underline{1}$$

$$\sec 2\pi = \frac{1}{\cos 2\pi}$$

$$8. \lim_{x \rightarrow \pi} \tan\left(\frac{3x}{4}\right) = \underline{-1}$$

$$\tan \frac{3\pi}{4}$$

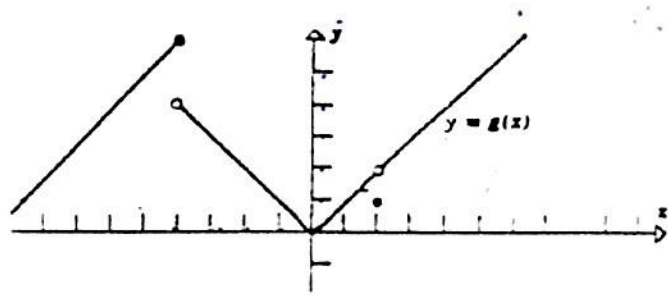
9. Find the limits using the piecewise function.

$$\lim_{x \rightarrow -4^-} g(x) = \underline{6}$$

$$\lim_{x \rightarrow -4^+} g(x) = \underline{4}$$

$$\lim_{x \rightarrow 2} g(x) = \underline{2}$$

$$g(2) = \underline{1}$$



10. Simplify. Answers should be in simplified radical form.

a) $\sqrt{\frac{18}{10}} =$

$$\frac{\sqrt{9}}{\sqrt{5}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$\frac{\sqrt{45}}{5}$$

$$\boxed{\frac{3\sqrt{5}}{5}}$$

b) $\frac{6}{\sqrt{5} + \sqrt{7}} \cdot \frac{(\sqrt{5} - \sqrt{7})}{(\sqrt{5} - \sqrt{7})}$

$$\frac{6\sqrt{5} - 6\sqrt{7}}{5 - 7}$$

$$-3\sqrt{5} + 3\sqrt{7}$$

$$\boxed{-3\sqrt{5} + 3\sqrt{7}}$$

c) $\frac{5}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\boxed{\frac{5\sqrt{2}}{4}}$$

d) $\frac{6}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$$\frac{6\sqrt{3}}{6}$$

$$\boxed{\sqrt{3}}$$