

## Calculus Section 1.2 Homework Answers

2.  $\lim_{x \rightarrow 8} f(x) = 25$  This means that as the input value,  $x$ , gets very close to 8, the output,  $f(x)$ , gets very close to 25.

3. 
$$\lim_{x \rightarrow 2} \frac{x-2}{x^2-x-2}$$

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	0.3448	0.3344	0.3334	0.3332	0.3322	0.3226

$\approx 0.3333$

4. 
$$\lim_{x \rightarrow 2} \frac{x-2}{x^2-4}$$

x	1.9	1.99	1.999	2.001	2.01	2.1
f(x)	0.2564	0.2506	0.2501	0.2499	0.2494	0.2439

$\approx 0.25$

5. 
$$\lim_{x \rightarrow 0} \frac{\sqrt{x+3} - \sqrt{3}}{x}$$

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)	0.2911	0.2889	0.2887	0.2887	0.2884	0.2863

$\approx 0.2887\dots\dots$

6. 
$$\lim_{x \rightarrow -3} \frac{\sqrt{1-x} - 2}{x+3}$$

x	-3.1	-3.01	-3.001	-2.999	-2.99	-2.9
f(x)	-0.2485	-0.2498	-0.2500	-0.2500	-0.2502	-0.2516

$\approx -0.25$

7. 
$$\lim_{x \rightarrow 3} \left[ \frac{1}{x+1} \right] - \frac{1}{4}$$

x	2.9	2.99	2.999	3.001	3.01	3.1
f(x)	-0.0641	-0.0627	-0.0625	-0.0625	-0.0623	-0.0610

$\approx -0.0625$

8. 
$$\lim_{x \rightarrow 3} \frac{\left[ \frac{x}{x+1} \right]^{-4/5}}{x-4}$$

x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)	0.0408	0.0401	0.0400	0.0400	0.0399	0.0392

≈ 0.04

9. 
$$\lim_{x \rightarrow 0} \frac{\sin x}{x}$$

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)	0.9983	0.99998	1.0000	1.0000	0.99998	0.9983

≈ 1.0000

10. 
$$\lim_{x \rightarrow 0} \frac{\cos x - 1}{x}$$

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)	0.0500	0.0050	0.0005	-0.0005	-0.0050	-0.0500

≈ 0.0000

- 11. 3
- 12. 3
- 13. 2
- 14. 3
- 15. Does not exist because it approaches two different values
- 16. Does not exist – approaches positive and negative infinity
- 17. Does not exist because it approaches infinity
- 18. 1
- 19. Does not exist because it oscillates between two distinct values
- 20. 1

37. 
$$\lim_{x \rightarrow 4} \frac{\sqrt{x+5} - 3}{x-4}$$
 It looks like it is about 1/6. It is not obvious by the graph that the function does not exist at x = 4.

- 42. If f(2) = 4 you cannot determine what the limit of f as x approaches 2 is. It might be a different value where the function is redefined at x=2.
- 43. False the limit can still exist at that point even if the function does not. Just like the graphs in the earlier problems where there is a hole at a certain value.
- 44. True
- 45. False - the function can be redefined at that point just like the graph in problem #13.
- 46. False – just like #13 again.