

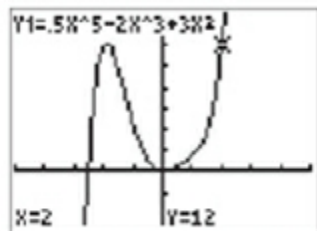
12-1 Estimating Limits Graphically

Estimate each limit using a graph. Support your conjecture using a table of values.

2. $\lim_{x \rightarrow 2} \left(\frac{1}{2}x^5 - 2x^3 + 3x^2 \right)$

ANSWER:

12



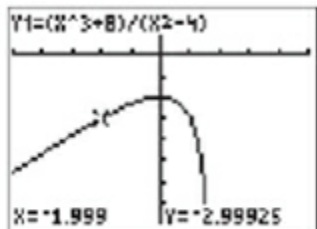
$[-5, 5]$ scl: 1 by $[-5, 15]$ scl: 2

x	1.99	1.999	2	2.001	2.01
f(x)	11.72	11.972		12.028	12.28

4. $\lim_{x \rightarrow -2} \frac{x^3 + 8}{x^2 - 4}$

ANSWER:

-3



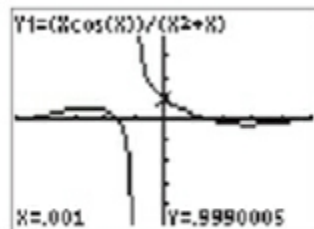
$[-5, 5]$ scl: 1 by $[-8, 2]$ scl: 1

x	-2.01	-2.001	-2	-1.999	-1.99
f(x)	-3.008	-3.0008		-2.9992	-2.993

6. $\lim_{x \rightarrow 0} \frac{x \cos x}{x^2 + x}$

ANSWER:

1



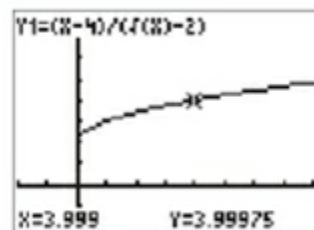
$[-5, 5]$ scl: 1 by $[-5, 5]$ scl: 1

x	-0.01	-0.001	0	0.001	0.01
f(x)	1.01	1.001		0.999	0.990

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

ANSWER:

4



$[-2, 8]$ scl: 1 by $[-2, 8]$ scl: 1

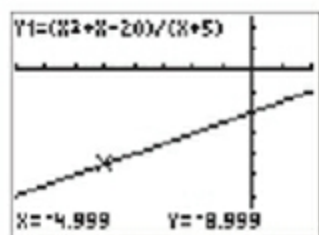
x	3.99	3.999	4	4.001	4.01
f(x)	3.998	3.9997		4.0002	4.003

12-1 Estimating Limits Graphically

10. $\lim_{x \rightarrow -5} \frac{x^2 + x - 20}{x + 5}$

ANSWER:

-9



$[-8, 2]$ scl: 1 by $[-15, 5]$ scl: 2

x	-5.01	-5.001	-5	-4.999	-4.99
f(x)	-9.01	-9.001		-8.999	-8.99

Estimate each one-sided or two-sided limit, if it exists.

12. $\lim_{x \rightarrow 0^-} \frac{|4x|}{x}$

ANSWER:

-4

14. $\lim_{x \rightarrow 9^+} \frac{3 - \sqrt{x}}{x - 9}$

ANSWER:

-0.1667

16. $\lim_{x \rightarrow \frac{1}{2}^-} \frac{|2x+1|}{x}$

ANSWER:

0

18. $\lim_{x \rightarrow -7} \frac{x^2 - x - 56}{x + 7}$

ANSWER:

-15

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

ANSWER:

10

22. $\lim_{x \rightarrow 0^+} (\sqrt{x} + 2x + 3)$

ANSWER:

3

24. $\lim_{x \rightarrow -1} \frac{|x+1|}{x^2 - 1}$

ANSWER:

does not exist

26. $\lim_{x \rightarrow 3} f(x)$ where $f(x) = \begin{cases} 3x & \text{if } x < 3 \\ x^2 & \text{if } x \geq 3 \end{cases}$

ANSWER:

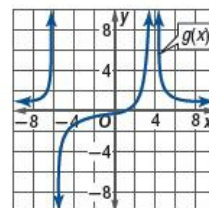
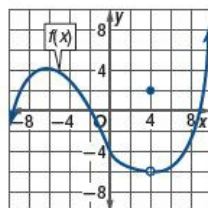
9

28. $\lim_{x \rightarrow 0} f(x)$ where $f(x) = \begin{cases} -x^2 + 2 & \text{if } x < 0 \\ \frac{2x}{x} & \text{if } x \geq 0 \end{cases}$

ANSWER:

2

For each function below, estimate each limit if it exists.



30. $\lim_{x \rightarrow 4} f(x)$

ANSWER:

-6

12-1 Estimating Limits Graphically

32. $\lim_{x \rightarrow -6} g(x)$

ANSWER:

does not exist

Estimate each limit, if it exists.

34. $\lim_{x \rightarrow 5} \frac{x^2}{x^2 - 10x + 25}$

ANSWER:

∞

36. $\lim_{x \rightarrow \infty} e^{2x-5}$

ANSWER:

∞

38. $\lim_{x \rightarrow -\infty} (x^5 - 7x^4 - 4x + 1)$

ANSWER:

$-\infty$

40. $\lim_{x \rightarrow -3} \frac{x^2 + 9x + 20}{x + 3}$

ANSWER:

does not exist

42. $\lim_{x \rightarrow \infty} x \cos x$

ANSWER:

does not exist

44. $\lim_{x \rightarrow 0} \frac{\sin|x|}{x}$

ANSWER:

does not exist

46. $\lim_{x \rightarrow -\infty} \frac{4x - 13}{2x + 8}$

ANSWER:

2