

Pre-Calculus Honors Homework Packet

Unit 9: Limits

9.1 Evaluating Limits Graphically

Refer to the graph at the right to find the following limits:

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

2. $\lim_{x \rightarrow 0} f(x)$

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

4. $\lim_{x \rightarrow 3^+} f(x)$

9. $\lim_{x \rightarrow -5} f(x) =$

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

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

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

6. $\lim_{x \rightarrow 3} f(x)$

7. $\lim_{x \rightarrow -1} f(x)$

8. $\lim_{x \rightarrow 1} f(x)$

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

13. $\lim_{x \rightarrow 5^+} f(x) =$

14. $\lim_{x \rightarrow 7} f(x) =$

15. $f(1)$

16. $\lim_{x \rightarrow 1^-} f(x)$

17. $\lim_{x \rightarrow 1^+} f(x)$

18. $\lim_{x \rightarrow 1} f(x)$

19. $f(3)$

20. $\lim_{x \rightarrow 3^-} f(x)$

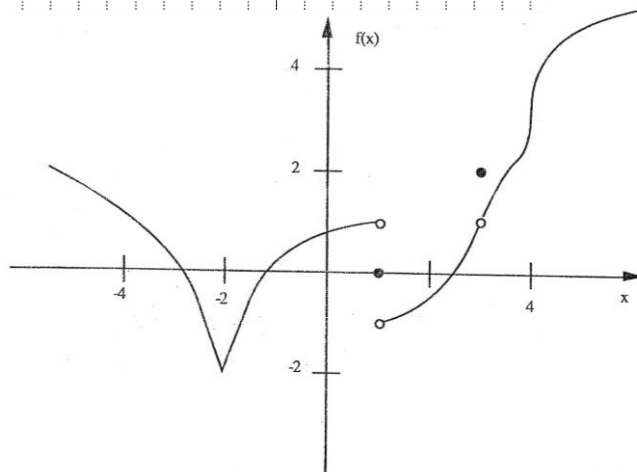
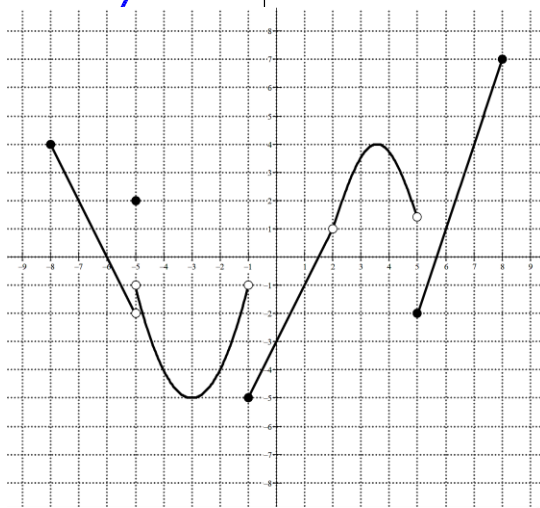
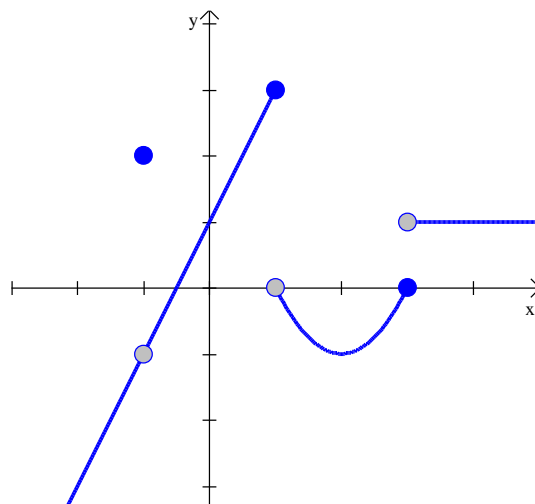
21. $\lim_{x \rightarrow 3^+} f(x)$

22. $\lim_{x \rightarrow 3} f(x)$

23. $\lim_{x \rightarrow -2} f(x)$

24. $\lim_{x \rightarrow 0} f(x)$

25. $\lim_{x \rightarrow -3} f(x)$



Sketch a graph the piecewise function. Then find the following limits.

$$f(x) = \begin{cases} x^2 + 3x + 5 & \text{if } x \leq -2 \\ 2x + 7 & \text{if } x > -2 \end{cases}$$

26. $\lim_{x \rightarrow -2^-} f(x)$

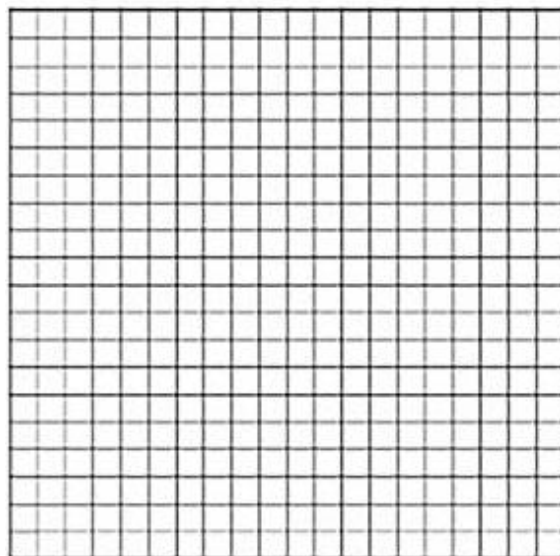
29. $\lim_{x \rightarrow -4} f(x)$

27. $\lim_{x \rightarrow -2^+} f(x)$

30. $\lim_{x \rightarrow 0^-} f(x)$

28. $\lim_{x \rightarrow -2} f(x)$

31. $\lim_{x \rightarrow 3} f(x)$

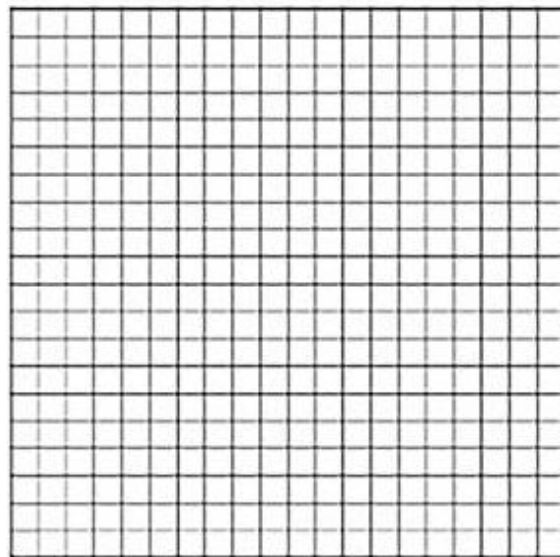


$$f(x) = \begin{cases} 7x + 2 & \text{if } x < -1 \\ -2x + 12 & \text{if } x \geq -1 \end{cases}$$

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

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

34. $\lim_{x \rightarrow -1} f(x) =$



9.2 Evaluating Limits Analytically

When possible, evaluate a limit using direct substitution. If direct substitution yields an undefined answer ($\neq 0$) or an indeterminate form ($0/0$), you must FACTOR and CANCEL to find an equivalent limit

$$1. \lim_{x \rightarrow 2} 3x^2 - 5x + 1$$

$$4. \lim_{x \rightarrow -3} \frac{x^2 + x - 6}{x + 3}$$

$$2. \lim_{x \rightarrow 6} \frac{5x + 2}{x - 1}$$

$$5. \lim_{x \rightarrow 5} \frac{x^2 - 25}{x^2 - 4x - 5}$$

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

Evaluate graphing, numerically, or analytically.

$$6. \lim_{x \rightarrow 1} -2x^3 + 5x - 1$$

$$12. \lim_{x \rightarrow 2} \frac{2x + 7}{x - 5}$$

$$7. \lim_{x \rightarrow \infty} x^4 + 5x^2$$

$$13. \lim_{x \rightarrow -2} \frac{2x + 4}{x^2 - 3x - 10}$$

$$8. \lim_{x \rightarrow -\infty} \frac{4x^2 + 5x}{x^2 - 1}$$

$$14. \lim_{x \rightarrow 5} \frac{2x + 4}{x^2 - 3x - 10}$$

$$9. \lim_{x \rightarrow 2} \frac{2x + 7}{x - 5}$$

$$15. \lim_{x \rightarrow 0} \frac{\sin x}{x}$$

$$10. \lim_{x \rightarrow 5} \frac{2x + 7}{x - 5}$$

$$16. \lim_{x \rightarrow 0} \frac{\cos x}{x}$$

$$11. \lim_{x \rightarrow \infty} \frac{2x + 7}{x - 5}$$

Limits and End Behavior

Polynomial Functions

Ex. $f(x) = 3x^5 + 3x - 1$

Ex. $f(x) = -4x^2 + 7$

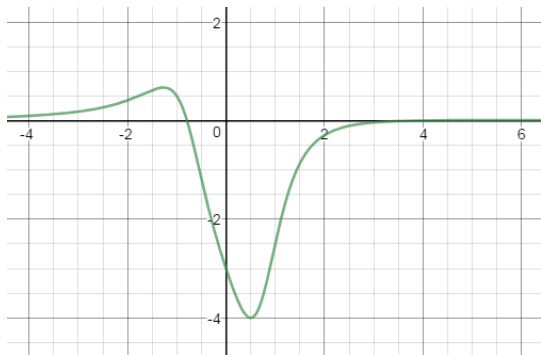
17. $\lim_{x \rightarrow \infty} f(x)$

19. $\lim_{x \rightarrow \infty} f(x)$

18. $\lim_{x \rightarrow -\infty} f(x)$

20. $\lim_{x \rightarrow -\infty} f(x)$

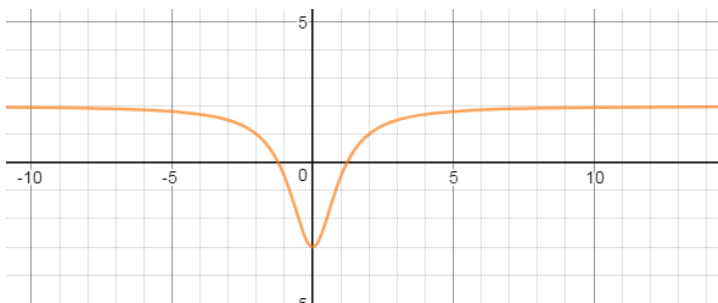
Rational Functions



Ex. $f(x) = \frac{x^2 - 3x - 3}{x^4 + 1}$

21. $\lim_{x \rightarrow \infty} f(x)$

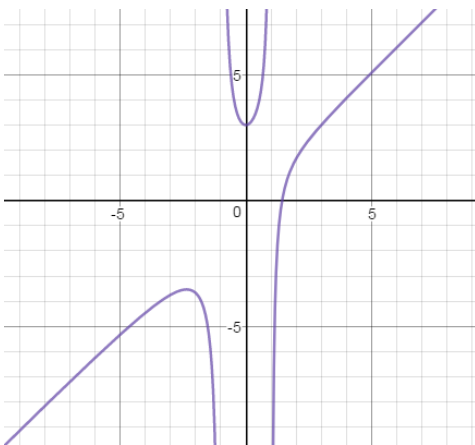
22. $\lim_{x \rightarrow -\infty} f(x)$



Ex. $f(x) = \frac{2x^2 - 3}{x^2 + 1}$

23. $\lim_{x \rightarrow \infty} f(x)$

24. $\lim_{x \rightarrow -\infty} f(x)$



Ex. $f(x) = \frac{x^3 - 3}{x^2 - 1}$

25. $\lim_{x \rightarrow \infty} f(x)$

26. $\lim_{x \rightarrow -\infty} f(x)$