

**** Quiz 1 Material ******Problem type 1: Evaluating Limits**

11–32 Evaluate the limit, if it exists.

$$11. \lim_{x \rightarrow 5} \frac{x^2 - 6x + 5}{x - 5}$$

$$18. \lim_{h \rightarrow 0} \frac{(2 + h)^3 - 8}{h}$$

$$20. \lim_{t \rightarrow 1} \frac{t^4 - 1}{t^3 - 1}$$

$$44. \lim_{x \rightarrow -2} \frac{2 - |x|}{2 + x}$$

29–39 Determine the infinite limit.

$$29. \lim_{x \rightarrow 5^+} \frac{x + 1}{x - 5}$$

$$36. \lim_{x \rightarrow \pi^-} \cot x$$

$$38. \text{ If } 2x \leq g(x) \leq x^4 - x^2 + 2 \text{ for all } x, \text{ evaluate } \lim_{x \rightarrow 1} g(x).$$

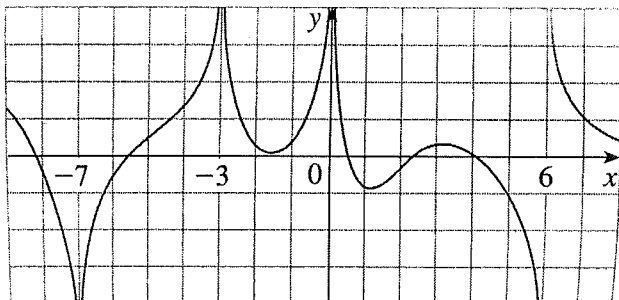
Problem Type 2: Sketching and graphs

9. For the function f whose graph is shown, state the following.

(a) $\lim_{x \rightarrow -7} f(x)$ (b) $\lim_{x \rightarrow -3} f(x)$ (c) $\lim_{x \rightarrow 0} f(x)$

(d) $\lim_{x \rightarrow 6^-} f(x)$ (e) $\lim_{x \rightarrow 6^+} f(x)$

(f) The equations of the vertical asymptotes.



15–18 Sketch the graph of an example of a function f that satisfies all of the given conditions.

15. $\lim_{x \rightarrow 0^-} f(x) = -1$, $\lim_{x \rightarrow 0^+} f(x) = 2$, $f(0) = 1$

**** Quiz 1 Material ****

Problem type 1: Evaluating Limits

11-32 Evaluate the limit, if it exists.

11. $\lim_{x \rightarrow 5} \frac{x^2 - 6x + 5}{x - 5}$ $\lim_{x \rightarrow 5} \frac{(x-5)(x-1)}{x-5}$ $\lim_{x \rightarrow 5} (x-1) = 5-1 = 4$ Ans = 4

18. $\lim_{h \rightarrow 0} \frac{(2+h)^3 - 8}{h}$ $\lim_{h \rightarrow 0} \frac{(2+h)(4+4h+h^2) - 8}{h}$ $\lim_{h \rightarrow 0} \frac{8 + 8h + 2h^2 + 4h + 4h^2 + h^3 - 8}{h}$ $\lim_{h \rightarrow 0} \frac{12h + 6h^2 + h^3}{h}$ $\lim_{h \rightarrow 0} (12 + 6h + h^2)$ $12 + 6(0) + 0^2$ Ans = 12

20. $\lim_{t \rightarrow 1} \frac{t^4 - 1}{t^3 - 1}$ L: $x = .999$, $y = 1.3$ R: $x = 1.001$, $y = 1.3$ Ans = $1.\bar{3}$ or $\frac{4}{3}$

44. $\lim_{x \rightarrow -2} \frac{2 - |x|}{2 + x}$ L: $x = -2.001$, $y = 1$ R: $x = -1.999$, $y = 1$ Ans = 1

29-39 Determine the infinite limit.

29. $\lim_{x \rightarrow 5^+} \frac{x+1}{x-5}$ R: $x = 5.001$, $y = 6001$ Ans = ∞

36. $\lim_{x \rightarrow \pi^-} \cot x$ $\lim_{x \rightarrow \pi^-} \left(\frac{1}{\tan x} \right)$ Ans = $-\infty$

$x = \pi^- = 3.14 - .001$
 $y = -1000$

38. If $2x \leq g(x) \leq x^4 - x^2 + 2$ for all x , evaluate $\lim_{x \rightarrow 1} g(x)$.

$2(1) \leq g(x) \leq 1^4 - 1^2 + 2$

$2 \leq g(x) \leq 2$

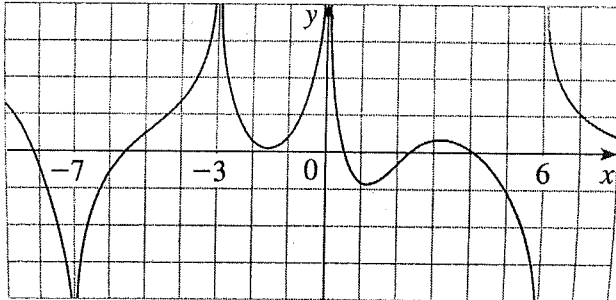
\downarrow
 2

$\lim_{x \rightarrow 1} g(x) = 2$

Problem Type 2: Sketching and graphs

9. For the function f whose graph is shown, state the following.

- (a) $\lim_{x \rightarrow -7} f(x) = -\infty$ (b) $\lim_{x \rightarrow -3} f(x) = \infty$ (c) $\lim_{x \rightarrow 0} f(x) = \infty$
 (d) $\lim_{x \rightarrow 6^-} f(x) = -\infty$ (e) $\lim_{x \rightarrow 6^+} f(x) = \infty$ $\lim_{x \rightarrow 6} f(x) = DNE$
 (f) The equations of the vertical asymptotes.



15-18 Sketch the graph of an example of a function f that satisfies all of the given conditions.

15. $\lim_{x \rightarrow 0^-} f(x) = -1$, $\lim_{x \rightarrow 0^+} f(x) = 2$, $f(0) = 1$
 (0, 1)

