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37. a) T b) T c) F d) T e) T

f) T g) F h) F i) F j) F

38. a) T b) F c) F d) T e) T

f) T g) T h) T i) T

39. a) 3 b) -2 c) DNE d) 1

40. a) 5 b) 2 c) DNE d) 2

41. a) -4 b) -4 c) -4 d) -4

42. a) 3 b) 3 c) 3 d) 3

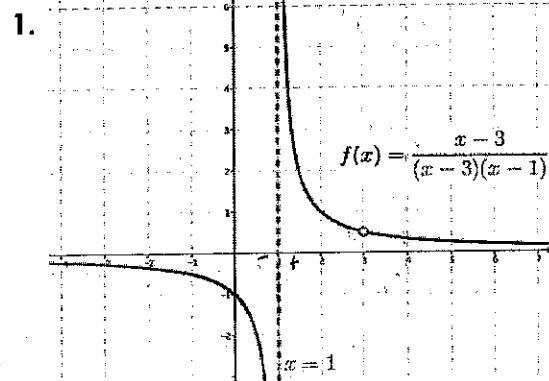
43. a) 4 b) -3 c) DNE d) 4

44. a) 1 b) 1 c) 1 d) 1

45. c 46. b 47. d 48. a

key

For the function  $f$  whose graph is given, state the value of the given quantity, if it exists. Identify any discontinuities in the graph of  $f$ .



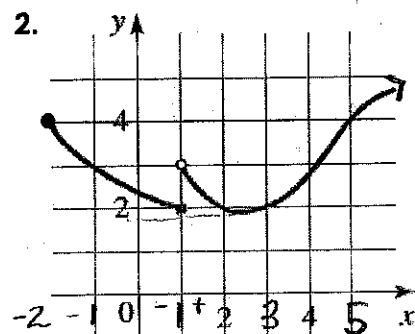
Domain:  $(-\infty, 1) \cup (1, 3) \cup (3, \infty)$  Range:  $(-\infty, 0) \cup (0, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

$\lim_{x \rightarrow 1^-} f(x) = -\infty$        $\lim_{x \rightarrow 3} f(x) = \frac{1}{2}$

$\lim_{x \rightarrow 1^+} f(x) = +\infty$        $f(3) = \text{und}$

$\lim_{x \rightarrow 1} f(x) = \text{dne}$        $f(1) = \text{und}$

$\lim_{x \rightarrow \infty} f(x) = 0$        $\lim_{x \rightarrow -\infty} f(x) = 0$



Domain:

$[-2, \infty)$

Range:

$[1.8, \infty)$

$\lim_{x \rightarrow 1^-} f(x) = 2$

$\lim_{x \rightarrow -1} f(x) = 3$

$\lim_{x \rightarrow 3} f(x) = 2$

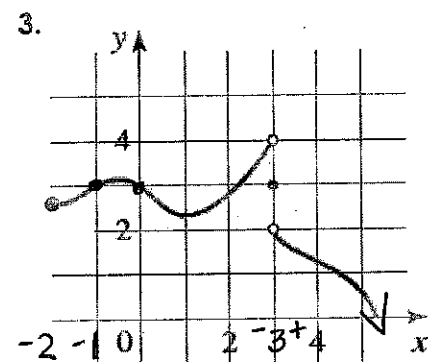
$\lim_{x \rightarrow 2} f(x) = \text{dne}$

$\lim_{x \rightarrow 1} f(x) = \text{dne}$

$\lim_{x \rightarrow 5} f(x) = 4$

$f(1) = 2$

$f(5) = 4$



Domain:

$[-2, \infty)$

Range:

$(-\infty, 4)$

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

$\lim_{x \rightarrow 0} f(x) = 3$

$\lim_{x \rightarrow 3^+} f(x) = 2$

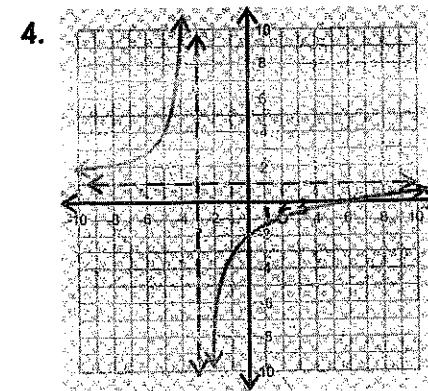
$\lim_{x \rightarrow -1} f(x) = 3$

$\lim_{x \rightarrow 3} f(x) = \text{dne}$

$f(-1) = 3$

$f(3) = 3$

$f(0) = 3$



Domain:

$(-\infty, -3) \cup (-3, 2) \cup (2, \infty)$

Range:

$(-\infty, 1) \cup (1, 1) \cup (1, \infty)$

$\lim_{x \rightarrow -3^+} f(x) = -\infty$

$\lim_{x \rightarrow -3^-} f(x) = +\infty$

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

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

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

$\lim_{x \rightarrow -3} f(x) = \text{dne}$