

Calculus 2-2

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

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

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

d) $\lim_{x \rightarrow 4} f(x) =$ not defined
(because no red line above or below that point)

The red line is printed too low, so imagine it up a little higher.

Go to the x-value and follow up or down until you reach the red line then follow across until you hit the y-axis.

2. a) $\lim_{x \rightarrow 2} x^3 = 2^3 = 8$

b) $\lim_{x \rightarrow \pi} x = \pi$

c) $\lim_{x \rightarrow 8} 3 = 3$

d) $\lim_{x \rightarrow 4} \sqrt{x} = \sqrt{4} = 2$

e) $\lim_{x \rightarrow k} x^6 = k^6$

f) $\lim_{x \rightarrow 0} \pi = \pi$

3. a) $\lim_{x \rightarrow 1} (3x-7) = 3 \cdot 1 - 7 = 3 - 7 = -4$

b) $\lim_{x \rightarrow -1} (2x^2 - 5x + 3) = 2(-1)^2 - 5(-1) + 3 = 2 + 5 + 3 = 10$

c) $\lim_{x \rightarrow 2} (x^3 + x^2 - 2x - 8) = 2^3 + 2^2 - 2 \cdot 2 - 8 = 8 + 4 - 4 - 8 = 0$

d) $\lim_{x \rightarrow -2} (x^2 + 5x + 3)^6 = [(-2)^2 + 5(-2) + 3]^6 = (4 - 10 + 3)^6 = (-3)^6 = 729$

2-2 cont.

$$3. e) \lim_{x \rightarrow 0} \frac{x-1}{x+1} = \frac{0-1}{0+1} = \frac{-1}{1} = -1$$

$$f) \lim_{x \rightarrow 4} \frac{x^2+2x-3}{x^2+2} = \frac{4^2+2 \cdot 4-3}{4^2+2} = \frac{16+8-3}{16+2} = \frac{21}{18} = \frac{7}{6}$$

$$g) \lim_{t \rightarrow 2} \frac{t^4-3t+1}{t^2(t-1)^3} = \frac{2^4-3 \cdot 2+1}{2^2(2-1)^3} = \frac{16-6+1}{4(1)^3} = \frac{11}{4}$$

$$h) \lim_{u \rightarrow -4} \sqrt{u^4+2u^2} = \sqrt{(-4)^4+2(-4)^2} = \sqrt{256+32} = \sqrt{288} = 12\sqrt{2}$$

$$i) \lim_{x \rightarrow 5} \sqrt[3]{x^2+2x-8} = \sqrt[3]{5^2+2 \cdot 5-8} = \sqrt[3]{25+10-8} = \sqrt[3]{27} = 3$$

$$j) \lim_{t \rightarrow 3} \left(2t^2 + \sqrt{\frac{6+t}{4-t}} \right) = 2 \cdot 3^2 + \sqrt{\frac{6+3}{4-3}} = 18 + \sqrt{\frac{9}{1}} = 18 + 3 = 21$$