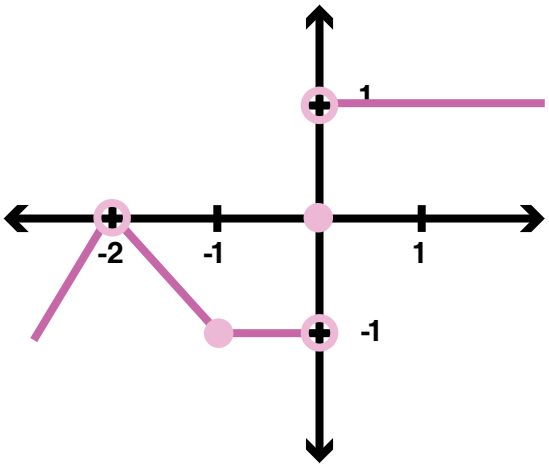
Limits Practice

Name: _____ Date: _____

Question 1

Find the limits



$\lim_{x \to -0.5} f(x) =$

$\lim_{x \to 0} f(x) =$

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

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

Question 2

Solve

I. $\lim_{x \to 6} 8(x-5)(x-7)$

II. $\lim_{x \to 0} \frac{\sqrt{5x+4}-2}{x}$

Limits Practice

III. $\lim_{x \to -3} \dfrac{x+3}{x^2+4x+3}$

IV. $\lim_{x \to 1} \dfrac{x^{-1}-1}{x-1}$

V. $\lim_{x \to 2} \dfrac{x^3-8}{x^4-16}$

VI. $\lim_{x \to 2} \dfrac{\sqrt{x^2+12}-4}{x-2}$

VII. $\lim_{x \to 0} (2\sin x - 1)$

VIII. $\lim_{x \to -\pi} \sqrt{x+4}\cos(x+\pi)$

IX. $\lim_{x \to 0} \sec x$

Limits Practice

X. $\lim_{h \to 0} \quad f(x) = 3x - 4 \qquad x = 2$

Question 3

Solve

$$\lim_{x \to c} f(x) = 5 \qquad \lim_{x \to c} g(x) = -2$$

I. $\lim_{x \to c} f(x)g(x)$

II. $\lim_{x \to c} (f(x) + 3g(x))$

III. $\lim_{x \to c} \dfrac{f(x)}{f(x) - g(x)}$

$$\lim_{x \to 4} f(x) = 0 \qquad \lim_{x \to 4} g(x) = -3$$

I. $\lim_{x \to 4} (g(x))^2$

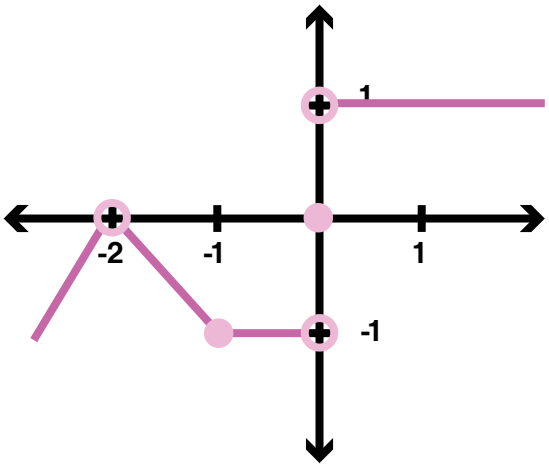
II. $\lim_{x \to 4} xf(x)$

Limits Practice

Name: **Key** Date: _____

Question 1

Find the limits



	Left	Right
$\lim_{x \to -0.5} f(x) = -1$	-1	-1
$\lim_{x \to 0} f(x) =$ None	-1	1
$\lim_{x \to -1} f(x) = -1$	-1	-1
$\lim_{x \to -2} f(x) = 0$	0	0

Question 2

Solve

I. $\lim_{x \to 6} 8(x-5)(x-7) \longrightarrow 8((6)-5)((6)-7) = -8$

II. $\lim_{x \to 0} \dfrac{\sqrt{5x+4}-2}{x} \longrightarrow \dfrac{\sqrt{5x+4}-2}{x} \cdot \dfrac{\sqrt{5x+4}+2}{\sqrt{5x+4}+2} \longrightarrow \dfrac{(5x+4)-4}{x\left(\sqrt{5x+4}+2\right)}$

$$\downarrow$$

$$5/4 = \dfrac{5}{\sqrt{5(0)+4}+2} \longleftarrow \dfrac{5}{\sqrt{5x+4}+2} \longleftarrow \dfrac{5\cancel{x}}{\cancel{x}\left(\sqrt{5x+4}+2\right)}$$

Limits Practice

III. $\lim_{x \to -3} \dfrac{x+3}{x^2+4x+3} \to \dfrac{\cancel{x+3}}{(x+1)(\cancel{x+3})} \to \dfrac{1}{x+1} \to \dfrac{1}{(-3)+1} = -1/2$

IV. $\lim_{x \to 1} \dfrac{x^{-1}-1}{x-1} \to \dfrac{\frac{1}{x}-1}{x-1} \to \dfrac{\frac{1-x}{x}}{x-1} \to \dfrac{1-x}{x} \cdot \dfrac{1}{x-1} \to \dfrac{1-x}{x(x-1)} \to \dfrac{-x+1}{x(x-1)}$

$$-1 = \frac{1}{-(1)} \leftarrow \frac{1}{-x} \leftarrow \frac{\cancel{-x+1}}{-x(\cancel{-x+1})}$$

V. $\lim_{x \to 2} \dfrac{x^3-8}{x^4-16} \to \dfrac{\cancel{(x-2)}(x^2+2x+4)}{\cancel{(x-2)}(x+2)(x^2+4)} \to \dfrac{x^2+2x+4}{(x+2)(x^2+4)} \to \dfrac{(2)^2+2(2)+4}{((2)+2)((2)^2+4)} = 3/8$

VI. $\lim_{x \to 2} \dfrac{\sqrt{x^2+12}-4}{x-2} \to \dfrac{\sqrt{x^2+12}-4}{x-2} \cdot \dfrac{\sqrt{x^2+12}+4}{\sqrt{x^2+12}+4} \to \dfrac{x^2+12-16}{(x-2)\left(\sqrt{x^2+12}+4\right)} \to \dfrac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}\left(\sqrt{x^2+12}+4\right)}$

$$1/2 = \frac{(2)+2}{\sqrt{(2)^2+12}+4} \leftarrow \frac{x+2}{\sqrt{x^2+12}+4}$$

VII. $\lim_{x \to 0} (2\sin x - 1) \to (2\sin(0) - 1) = -1$

VIII. $\lim_{x \to -\pi} \sqrt{x+4}\cos(x+\pi) \to \sqrt{(-\pi)+4}\cos((-\pi)+\pi) \to \sqrt{(-\pi)+4} \cdot 1 \to \sqrt{-\pi+4}$

IX. $\lim_{x \to 0} \sec x \to \dfrac{1}{\cos x} \to \dfrac{1}{\cos(0)} = 1$

Limits Practice

X. $\lim_{h \to 0}$ $f(x) = 3x - 4$ $x = 2$

$$\frac{(3(x+h)-4)-(3x-4)}{h} \rightarrow \frac{(3((2)+h)-4)-(3(2)-4)}{h} \rightarrow \frac{(6+3h-4)-(6-4)}{h}$$

$$\downarrow$$

$$3 = \frac{3\cancel{h}}{\cancel{h}} \leftarrow \frac{6+3h-6}{h} \leftarrow \frac{6+3h-4-2}{h} \leftarrow \frac{(6+3h-4)-(2)}{h}$$

Question 3

Solve

$\lim_{x \to c} f(x) = 5$ $\lim_{x \to c} g(x) = -2$

I. $\lim_{x \to c} f(x)g(x) \rightarrow 5 \cdot -2 = -10$

II. $\lim_{x \to c} (f(x) + 3g(x)) \rightarrow 5 + (3 \cdot -2) = -1$

III. $\lim_{x \to c} \frac{f(x)}{f(x) - g(x)} \rightarrow \frac{5}{5 - -2} \rightarrow \frac{5}{7}$

$\lim_{x \to 4} f(x) = 0$ $\lim_{x \to 4} g(x) = -3$

I. $\lim_{x \to 4} (g(x))^2 \rightarrow (-3)^2 = 9$

II. $\lim_{x \to 4} xf(x) \rightarrow (4)(0) = 0$