$$\lim_{x\to 8}\frac{\sqrt{x+1}}{x+5} = \frac{\sqrt{8+1}}{8+5} = \frac{\sqrt{9}}{13} = \frac{3}{13}$$

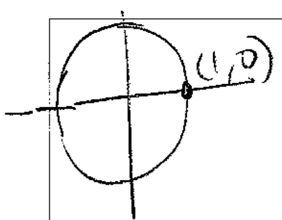
3

$$\lim_{x\to 0}\frac{\frac{1}{x-3}\cdot\frac{(3)}{(3)}+\frac{1}{3}\cdot\frac{(x-3)}{(x-3)}}{x} \qquad \frac{3+x-3}{3(x-3)} = \frac{x}{3(x-3)}$$

$$\frac{\cancel{x}}{3(x-3)}\cdot\frac{1}{\cancel{x}} = \frac{1}{3(x-3)}$$

$$\lim_{x\to 0}\frac{1}{3(x-3)} = \frac{1}{3(0-3)} = \frac{1}{-9}$$

3/13



$$\lim_{x\to 0}\frac{1-\cos^2 x}{x} = \frac{\sin^2 x}{x} = \frac{\sin x}{x}\cdot \sin x$$

$$\underbrace{\lim_{x\to 0}\frac{\sin x}{x}}_{(1)}\cdot\underbrace{\lim_{x\to 0}\sin x}_{(0)} = \boxed{0}$$

-1/9

$$\lim_{x\to 4}\frac{x^3-64}{x-4} \qquad \frac{\cancel{(x-4)}(x^2+4x+16)}{\cancel{(x-4)}}$$

$$\lim_{x\to 4}(x^2+4x+16) =$$

$$(4)^2+4(4)+16 = 48$$

0

$$\lim_{x\to\infty} \frac{4x^3 - 5}{16x^3 + 2x^2 + 5}$$

$$\frac{\frac{4x^3}{x^3} - \frac{5}{x^3}}{\frac{16x^3}{x^3} + \frac{2x^2}{x^3} + \frac{5}{x^3}}$$

$$\lim_{x\to\infty} \frac{4 - \frac{5}{x^3}}{16 + \frac{2}{x} + \frac{5}{x^3}} = \frac{4-0}{16+0+0} = \frac{4}{16} = \frac{1}{4}$$

48

Page 5

$$\lim_{x\to 0} \frac{\sin 4x}{7x} = \frac{1}{7} \lim_{x\to 0} \frac{\sin 4x}{x}$$

$$= \frac{1}{7}(4) \cdot \lim_{x\to 0} \frac{\sin 4x}{4x}$$

$$= \frac{4}{7}(1) = 4/7$$

1/4

Page 6

Let f be the piecewise function, where c is a constant. For what value of c, if any, is f continuous at $x = 2$?

$(1,0)$

$$f(x) = \begin{cases} x^2 \sin(\pi x) & \text{for } x < 2 \\ x^2 + cx - 18 & \text{for } x \geq 2 \end{cases}$$

$$(2)^2 \sin(2\pi) = (2)^2 + c(2) - 18$$

$$4(0) = 4 + 2c - 18$$

$$0 = 2c - 14$$

$$14 = 2c$$

$$c = 7$$

4/7

Page 7

$-3x - 8x$

Let f be the functions given by $f(x) = \frac{(x-4)(2x-3)}{(x-1)^2}$.

If the line $y = b$ is a horizontal asymptote to the graph of f, the what is the value of b?

$$f(x) = \frac{2x^2 - 11x + 12}{x^2 - 2x + 1}$$

H.A. at $y = 2$

$b = 2$

7

Page 8

$$\lim_{x\to 0}\frac{\sqrt{x+9}-3}{x}\cdot\frac{\sqrt{x+9}+3}{\sqrt{x+9}+3}$$

$$\frac{\cancel{x}+\cancel{9}-\cancel{9}}{(\cancel{x})(\sqrt{x+9}+3)} = \frac{1}{\sqrt{x+9}+3} \to \lim_{x\to 0}\frac{1}{\sqrt{x+9}+3} = \frac{1}{\sqrt{0+9}+3}$$

$$= \frac{1}{3+3}$$

$$= 1/6$$

2

Page 9

$$\begin{array}{r} 54 \\ \times 2 \\ \hline 108 \end{array}$$

If $\lim\limits_{x\to c} f(x) = 9$ and $\lim\limits_{x\to c} g(x) = 6$,

find $\lim\limits_{x\to c}\left([f(x)]^2 - 2f(x)g(x) + [g(x)]^2\right)$

$$[9]^2 - 2(9)(6) + (6)^2$$

$$81 - 108 + 36 = 9$$

$$\begin{array}{r} 81 \\ 36 \\ \hline 117 \end{array} \quad \begin{array}{r} 117 \\ -108 \\ \hline 9 \end{array}$$

1/6

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plug in $x=2.1$

$$\lim_{x\to 2^+}\frac{3-2x}{x-2} \to \frac{3-2(2.1)}{2.1-2} = \frac{-}{+}$$

$$= \boxed{-\infty}$$

$x=2$ is V.A

9

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$$\lim_{x\to 0}\frac{5\tan x}{x\sec x} = \lim_{x\to 0}\frac{5\sin x}{x}$$

$$= 5\lim_{x\to 0}\frac{\sin x}{x}$$

$$\frac{\tan x}{\sec x} = \frac{\frac{\sin x}{\cos x}}{\frac{1}{\cos x}} = \frac{\sin x}{\cancel{\cos x}}\cdot\frac{\cancel{\cos x}}{1} = \sin x$$

$$= 5(1)$$

$$= 5$$

-∞

Page 12

$$\lim_{x \to \infty} 3x^5 + 6x - 4$$

odd degree
$+$ leading coeff $\boxed{\infty}$

*

5

Page 13

$$\sqrt{x^2} = -x$$

$$\lim_{x \to -\infty} \frac{5x - 1}{\sqrt{2x^2 + 1}} \quad \frac{\frac{5x}{-x} - \frac{1}{-x}}{\sqrt{\frac{2x^2}{x^2} + \frac{1}{x^2}}}$$

$$\lim_{x \to -\infty} \frac{-5 + \frac{1}{x}}{\sqrt{2 + \frac{1}{x^2}}} = \frac{-5 + 0}{\sqrt{2 + 0}} = \frac{-5}{\sqrt{2}}$$

∞

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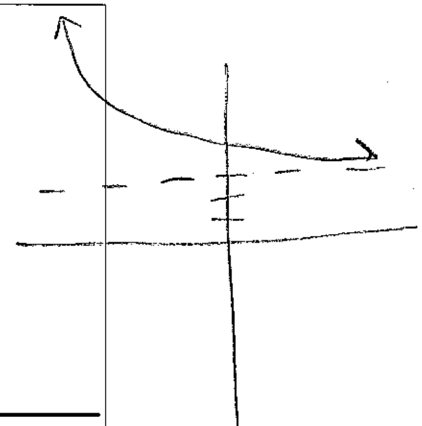
growth
refl. over y

$$\lim_{x \to \infty} 2^{-x-2} + 3$$



3

-5/√2

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