

A) Discontinua Reparable:

$$\{-4, 0, 4\}$$

b) Discontinua irreparable:

$$\{-3, 2, 10\}$$

c) Continua:

$$\mathbb{R} - \{-4, -3, 0, 2, 4, 10\}$$

$$A) \lim_{x \rightarrow \frac{3\pi}{4}} \left(\frac{1 + \tan(x)}{\sin(x) + \cos(x)} \right) = \frac{0}{0} \text{ ind}$$

$$\lim_{x \rightarrow \frac{3\pi}{4}} \left(\frac{1 + \frac{\sin(x)}{\cos(x)}}{\sin(x) + \cos(x)} \right) \quad \lim_{x \rightarrow \frac{3\pi}{4}} \frac{\cos(x) + \sin(x)}{\cos(x) \cdot \frac{\sin(x) + \cos(x)}{1}}$$

$$\lim_{x \rightarrow \frac{3\pi}{4}} \frac{(\cos(x) + \sin(x))}{(\cos(x))(\sin(x) + \cos(x))} \quad \lim_{x \rightarrow \frac{3\pi}{4}} \frac{1}{\cos(x)} = \frac{1}{-\frac{\sqrt{2}}{2}} = \frac{-2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$$

$$b) \lim_{x \rightarrow 0} \left(\frac{4x + \sin(3x)}{x \cdot \sec(x)} \right) = \frac{0}{0} \text{ ind}$$

$$\lim_{x \rightarrow 0} \left(\frac{4x + \sin(3x)}{x \cdot \sec(x)} \right) \quad \lim_{x \rightarrow 0} \frac{4x + \sin(3x)}{x \cdot \frac{1}{\cos(x)}} \quad \lim_{x \rightarrow 0} \frac{4x + \sin(3x)}{\underbrace{x}_{\frac{x}{\cos(x)}} \cdot 1}$$

$$\lim_{x \rightarrow 0} 4x + \sin(3x) : x \quad \lim_{x \rightarrow 0} \frac{4x}{x} + 3 \frac{\sin(3x)}{3x} = 4 + 3 = 7$$

$$c) \lim_{x \rightarrow \infty} \left(\frac{x^2 - 9}{x(x^2 + 1)} \right) \frac{\infty}{\infty} = \text{ind}$$

$$\lim_{x \rightarrow \infty} \left(\frac{x^2 - 9}{x(x^2 + 1)} \right) \quad \lim_{x \rightarrow \infty} \left(\frac{x^2 - 9}{x^3 + x} \right) : x^3 \quad \lim_{x \rightarrow \infty} \left(\frac{\frac{1}{x} - \frac{9}{x^3}}{1 + \frac{1}{x^2}} \right) = \frac{0}{1} = 0$$

$$A) \frac{dy}{dx} \quad y = \ln(x) - \sin(x) + \frac{e^x}{4} - \ln(4)$$

$$\frac{dy}{dx} = \frac{1}{x} - \cos(x) + \frac{((e^x \cdot 4) - (e^x \cdot 0))}{16}$$

$$\frac{dy}{dx} = \frac{1}{x} - \cos(x) + \frac{e^x}{4}$$

$$b) y = (x^4 + x) \cdot (\sqrt{x} + \cos(x))$$

$$\frac{dy}{dx} = (4x^3 + 1) \cdot (\sqrt{x} + \cos(x)) + (x^4 + x) \cdot \left(\frac{1}{2\sqrt{x}} - \sin(x) \right)$$

$$c) y = \frac{\tan(x)}{e^x}$$

$$\frac{dy}{dx} = \frac{(\sec^2(x)) \cdot (e^x) - (\tan(x) \cdot e^x)}{(e^x)^2}$$

$$A) y = \sqrt{x^2 + \sqrt{\cos(x^3)}}$$

$$\frac{dy}{dx} = \left(\frac{1}{2\sqrt{x^2 + \sqrt{\cos(x^3)}}} \right) \cdot (2x) + \left(\frac{1}{2\sqrt{\cos(x^3)}} \right) \cdot (-\sin(x^3)) \cdot (3x^2)$$

$$b) y = ((x+1)^4 \cdot (\sin^3(2 + \ln(x))))$$

$$\begin{aligned} \frac{dy}{dx} &= ((x+1)^4)' \cdot (\sin^3(2 + \ln(x))) + (x+1)^4 \cdot (\sin^3(2 + \ln(x)))' \\ &= (4(x+1)^3 \cdot 1) \cdot (\sin^3(2 + \ln(x))) + (x+1)^4 \cdot 3(\sin(2 + \ln(x)))^2 \cdot \cos(2 + \ln(x)) \cdot \frac{1}{x} \end{aligned}$$

$$c) y = \frac{e^{x^5}}{x^5 + x^3}$$

$$\frac{dy}{dx} = \frac{(e^{x^5})' \cdot (x^5 + x^3) - (e^{x^5}) \cdot (x^5 + x^3)'}{(x^5 + x^3)^2}$$

$$= \frac{(e^{x^5} \cdot 5x^4) \cdot (x^5 + x^3) - (e^{x^5}) \cdot (5x^4 + 3x^2)}{(x^5 + x^3)^2}$$