Total possible is 43

Name: _____

Math 150 Quiz 2 Spring 2024

NO CALCULATORS

1. [5 points each] Find the following limits. Show your work.

a. $\lim_{x\to 0} \frac{\sin 4x}{\sin 6x}$ $= \lim_{x\to 0} \frac{4}{6} \frac{\sin 4x}{4x} \frac{6x}{\sin 6x}$

$= \frac{4}{6} \lim_{x\to 0} \frac{\sin 4x}{4x} \lim_{x\to 0} \frac{6x}{\sin 6x}$

$= \frac{4}{6} \cdot 1 \cdot 1 = \frac{4}{6}$

b. $\lim_{t\to \pi} t\cos t$ $= \lim_{t\to\pi} t \cdot \lim_{t\to\pi} \cos t$

$= \pi \cdot \cos(\pi) = -\pi$

c. $\lim_{x\to -2} \frac{x+2}{x^3+8}$ Hint: Factor.

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

$= \lim_{x\to -2} \frac{1}{x^2-2x+4} = \frac{1}{\lim_{x\to -2} x^2-2x+4}$

$= \frac{1}{4+4+4} = \frac{1}{12}$

d. $\lim_{x\to 2} \frac{x+2}{x^3+8}$ Hint: Do not factor.

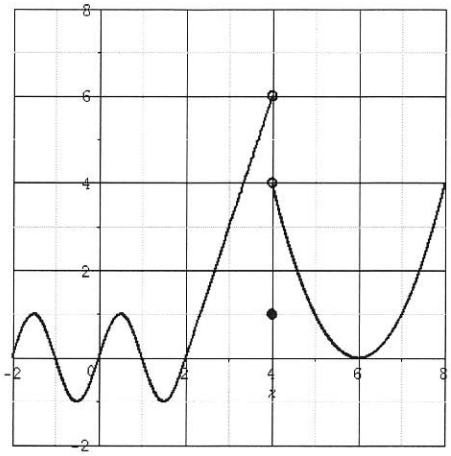
$= \frac{\lim_{x\to 2} x+2}{\lim_{x\to 2} x^3+8} = \frac{2+2}{8+8} = \frac{4}{16} = \frac{1}{4}$

e. $\lim_{x\to 3} \frac{\sqrt{x^2-25}}{x-3}$ Hint: Don't think outside the box.

$\sqrt{3^2-25}$ is not a real number. Numbers near $x=3$ are not in the domain.

Thus, this limit does not exist.

2. [2 points each] Study the graph below of $y = f(x)$. Using the graph find the following limits.



a. $\lim_{x \to 2^-} f(x)$ = 6

b. $\lim_{x \to 2^+} f(x)$ = 6

c. $\lim_{x \to 2} f(x)$ = 6

d. $\lim_{x \to 3^-} f(x)$ = 3

e. $\lim_{x \to 3^+} f(x)$ = 3

f. $\lim_{x \to 3} f(x)$ = 3

g. $\lim_{x \to 4^-} f(x)$ = 6

h. $\lim_{x \to 4^+} f(x)$ = 4

i. $\lim_{x \to 4} f(x)$ does not exist (dne)

25+18 = 43 total possible

Name: _____

Math 150 Quiz 2 Spring 2024

NO CALCULATORS

1. [5 points each] Find the following limits. Show your work.

a. $\lim_{x\to 0} \frac{\sin 6x}{\sin 4x}$ $= \lim_{x\to 0} \frac{6}{4} \frac{\sin 6x}{6x} \frac{4x}{\sin 4x}$

$= \frac{6}{4} \lim_{x\to 0} \frac{\sin 6x}{6x} \cdot \lim_{x\to 0} \frac{4x}{\sin 4x}$

$= \frac{6}{4} \cdot 1 \cdot 1 = \frac{6}{4}$

b. $\lim_{t\to \pi/2} t \sin t$ $= \lim_{t\to \frac{\pi}{2}} t \cdot \lim_{t\to \frac{\pi}{2}} \sin t$

$= \frac{\pi}{2} \cdot \sin\left(\frac{\pi}{2}\right) = \frac{\pi}{2} \cdot 1 = \frac{\pi}{2}$

c. $\lim_{x\to -2} \frac{x+2}{x^3+8}$ Hint: Factor.

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

$= \lim_{x\to -2} \frac{1}{x^2-2x+4} = \frac{1}{\lim_{x\to -2} x^2-2x+4}$

$= \frac{1}{4+4+4} = \frac{1}{12}$

d. $\lim_{x\to 2} \frac{x+2}{x^3+8}$ Hint: Do not factor.

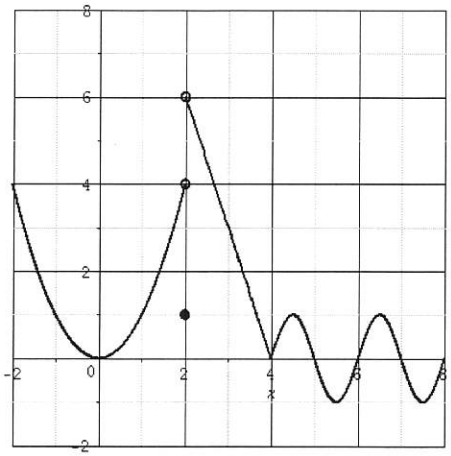
$= \frac{\lim_{x\to 2} x+2}{\lim_{x\to 2} x^3+8} = \frac{2+2}{2^3+8} = \frac{4}{16} = \frac{1}{4}$

e. $\lim_{x\to 3} \frac{\sqrt{x^2-20}}{x-3}$ Hint: Don't think outside the box.

$\sqrt{3^2-20}$ is not a real number.

Thus, this limit does not exist.

2. [2 points each] Study the graph below of $y = f(x)$. Using the graph find the following limits.



a. $\lim_{x \to 2^-} f(x)$ = 4

b. $\lim_{x \to 2^+} f(x)$ = 6

c. $\lim_{x \to 2} f(x)$ does not exist (dne)

d. $\lim_{x \to 3^-} f(x)$ = 3

e. $\lim_{x \to 3^+} f(x)$ = 3

f. $\lim_{x \to 3} f(x)$ = 3

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

h. $\lim_{x \to 4^+} f(x)$ = 0

i. $\lim_{x \to 4} f(x)$ = 0