Lab Worksheet for November 23 , 2021

Practice with L'Hopital's Rule and curve-sketching .

Compute the following limits.

1. $\lim_{x\to 2} \frac{x^3-7x^2+10x}{x^2+x-6}$

2. $\lim_{x\to -4} \frac{\sin(\pi x)}{x^2-16}$

3. $\lim_{x\to \infty} \frac{\ln(3x)}{x^2}$

4. $\lim_{x\to 0} \frac{\sin(2x)+7x^2-2x}{x^2(x+1)^2}$

5. $\lim_{x\to -\infty} \frac{x^2}{e^{1-x}}$

6. $\lim_{x\to\infty} \frac{x^2+e^{4x}}{2x-e^x}$

7. $\lim_{x\to\infty} x(ln\left(1+\frac{3}{x}\right))$

8. $\lim_{x\to 0^+} x^2(ln(4x^2))$

9. $\lim_{x\to 1^+} (x-1)\tan(\frac{\pi}{2}x)$

10. $\lim_{x\to\infty} [e^x + x]^{\frac{1}{x}}$

11. Sketch the following graph.

$$\boldsymbol{f(x) = \frac{x+2}{x^2-16}}$$

12. Sketch the following graph.

$$\boldsymbol{f(x) = \frac{e^x}{1+e^x}}$$

11. Sketch the following graph.

$$\boldsymbol{f(x) = \frac{x^2+4}{x^2-9}}$$

12. You are told a function f has the following properties:

a) $\lim_{x\to-\infty} f(x) = 4$

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

c) f is continuous and defined everywhere,

d) f''(x) is positive when x is between -2 and 7,

e) f"(x) is negative when x <-2 and when x > 5.

Sketch the graph.

13. You are told a function f has the following properties:

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

b) $\lim_{x\to\infty} f(x) = 8$

c) $\lim_{x\to1^-} f(x) = -\infty$

d) $\lim_{x\to1^+} f(x) = -\infty$

e) f”(x) < 0 when x is less than -5,

f) f’’(x) > 0 when x is between -5 and 1,

g) f”(x)> 0 when x is larger than 1.

Sketch the graph.