

Math 16, Homework 11

Find the following limits; use L'Hôpital's rule where appropriate.

1. $\lim_{x \rightarrow \infty} \frac{2x^2 + 1}{5x^2 + 3x + 2}$.

2. $\lim_{x \rightarrow \infty} \frac{\sin(x^2)}{x}$.

3. $\lim_{x \rightarrow 1} \frac{\sin(x^2)}{x - 1}$.

4. $\lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^2}$.

5. $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{x \sin(x)}$.

6. $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2 + 4}}{x}$.

7. $\lim_{x \rightarrow -\infty} \frac{x^3 - 3x^2 + 2x}{x^4 - 3x}$.

8. $\lim_{x \rightarrow -\infty} \frac{2^x}{10^x}$.

9. $\lim_{x \rightarrow \infty} \frac{\ln(x)}{x}$.

10. $\lim_{x \rightarrow \infty} \frac{x \ln(\ln(x))}{\ln(x)}$.

Graph each of the following functions on the interval $[0, \infty)$.

Pay particular attention to the behavior at 0 and at ∞ .

11. $A(x) = \frac{2x^2}{1 + x}$.

12. $B(x) = \frac{2x^2}{1 + 2x^2}$.

13. $C(x) = \frac{1 + x + 2x^2}{1 + x}$.

14. $D(x) = \frac{1 + x}{1 + x + 2x^2}$.

15. $E(x) = \frac{1 + e^x}{1 + x + e^{2x}}$.