

- The problems here were taken from the site ‘abetterfilecabinet’.
- Find the following limits. Be sure to explain your reasoning at each step.

$$\begin{array}{lll}
 a) \lim_{x \rightarrow \infty} \frac{x + \sin x}{5x + 6} & b) \lim_{x \rightarrow \infty} \frac{\sin x}{x} & c) \lim_{x \rightarrow \infty} x \sin \frac{1}{x} \\
 d) \lim_{x \rightarrow \infty} \frac{x \sin x}{x^2 + 5} & e) \lim_{x \rightarrow \infty} \sqrt{x^2 + x} - x & f) \lim_{x \rightarrow \infty} \frac{x^2(1 + \sin^2 x)}{(x + \sin x)^2}
 \end{array}$$

- Compute the following limits algebraically:

$$\lim_{x \rightarrow 2} \frac{|x - 2|}{x^2 - 2x}$$

$$\lim_{x \rightarrow -1^+} \frac{|x + 1|}{x^3 + 1}$$

$$\lim_{x \rightarrow 2} \frac{(x - 2)^2}{|x - 2|}$$

Note: These are all previous exam problems!

- For $n = 3, 4, 5$ find the perimeter of an n -sided regular polygon (i.e. an equilateral triangle, a square, and a regular pentagon) inscribed in a circle of radius 2.
 - Find a general formula for an n -sided regular polygon’s perimeter (inscribed in a circle of radius 2).
 - Draw a picture of a circle of radius 2 with a twelve and a 20-sided regular polygon inscribed.
 - What is the limit, as $n \rightarrow \infty$ of the formula you found in part (b).
- Let

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

- Sketch the graph of $f(x)$, and determine its domain and range.
- Evaluate $f(-1)$ and $f(1)$.
- Evaluate

$$\lim_{x \rightarrow -1} f(x) \quad \text{and} \quad \lim_{x \rightarrow 1} f(x).$$

6. How long does it take for a sum of money to double when compounded continuously (a) at 6%, (b) at 8%, and (c) at 10% ?
7. At what rate r of continuous compounding does a sum of money triple in 20 years?