Warm-up Problems

1. Rationalize the denominator (get the square root out of the denominator using algebra):
   
   (a) \( \frac{1}{\sqrt{2}} = \) 
   
   (b) \( \frac{1}{1 - \sqrt{3}} = \) 
   
   (c) \( \frac{1}{\sqrt{2} + \sqrt{5}} = \)

Lecture Problems

2. Compute the limits by plugging in. If that fails, try manipulating algebraically. If that
   fails, try making a table of values.
   
   (a) \( \lim_{x \to 5} \frac{x^3 - 2x + 1}{x^2 + 1} = \) 
   
   (b) \( \lim_{x \to 3} \sin x = \) 
   
   (c) \( \lim_{x \to 2} \frac{x^2 - 2x + 7}{x^2 + 1} = \) 
   
   (d) \( \lim_{x \to 5} \frac{x^2 - 6x + 5}{x - 5} = \) 
   
   (e) \( \lim_{x \to -2} \frac{x + 2}{x^2 + 8} = \)

3. Given the following:
   
   \( \lim_{x \to 2} f(x) = 4 \quad \lim_{x \to 2} g(x) = 2 \quad \lim_{x \to 2} h(x) = 0 \)

   Find the following:
   
   (a) \( \lim_{x \to 2} f(x) - 3g(x) = \) 
   
   (b) \( \lim_{x \to 2} \frac{(f(x))^3 + 1}{g(x) + 3h(x)} = \) 
   
   (c) \( \lim_{x \to 2} \frac{f(x) - 2g(x)}{h(x)} = \) 
   
   (d) \( \lim_{x \to 2} \frac{f(x) - g(x)}{h(x)} = \) 
   
   (e) \( \lim_{x \to 2} \frac{h(x)}{f(x) - g(x)} = \) 
   
   (f) \( \lim_{x \to 2} \sqrt{8f(x) - g^2(x)} = \)