1. (4 points each) Determine the given limit.

(a)
$$\lim_{x \to 2} \frac{x^2 - 5x + 6}{x - 2} =$$

(b)
$$\lim_{x \to 2^+} \frac{x^2 - 5x + 5}{x - 2} = \underline{\hspace{1cm}}$$

(c)
$$\lim_{x \to 2^{-}} \frac{|x^2 - 5x + 6|}{x - 2} =$$

(d)
$$\lim_{x \to \infty} \frac{3x^2 - 7x + 1}{x^3 - 1} = \underline{\hspace{1cm}}$$

(e)
$$\lim_{x \to 0} \frac{21^x - 1}{x} =$$

2. (5 points each) Determine the derivative function.

(a)
$$f(x) = \sqrt{x^2 + e^{2x}}$$

(b)
$$f(x) = (4x - 7)^3 (7x^2 + 4)^4$$

(c)
$$f(x) = \frac{3x}{x + 5\tan 3x}$$

(d)
$$f(x) = \sin^3(4x+1)$$

(e)
$$f(x) = (1 - x^2)^{10} + 10^{1 - x^2}$$

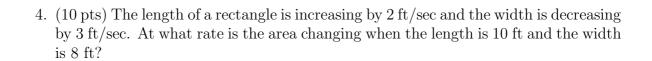
(f)
$$f(x) = x^2 \ln(1 + x^2)$$

(g)
$$f(x) = \ln \left(\frac{e^{2x}(3x+7)^2}{(x+2\cos(x))^2} \right)$$

$$(h) f(x) = x^{3x}$$

3. (5 points) Determine the inverse of

$$f(x) = 4 + 7e^{-x/2}.$$



5. (10 pts) Determine the equation of the tangent line to the curve

$$(x+2y)^3 + (2x+y)^3 + 2xy = -2$$

at the point (-1,1).

