a) $P_2(x) = \frac{(x-x_1)(x-x_2)}{(x_0-x_1)(x_0-x_2)} f(x_0) + \frac{(x-x_0)(x-x_2)}{(x_1-x_0)(x_1-x_2)} f(x_1) + \frac{(x-x_0)(x-x_1)}{(x_2-x_0)(x_2-x_1)} f(x_2)$

b) $P_2'(x) = \frac{x^2-x_1x-x_2x+x_1x_2}{(x_0-x_1)(x_0-x_2)} f(x_0) + \frac{x^2-x_0x-x_2x+x_0x_2}{(x_1-x_0)(x_1-x_2)} f(x_1)$

$\frac{x^2-x_0x-x_1x+x_0x_1}{(x_2-x_0)(x_2-x_1)} f(x_2)$

$P_2'(x) = \frac{2x-x_1-x_2}{(x_0-x_1)(x_0-x_2)} f(x_0) + \frac{2x-x_0-x_2}{(x_1-x_0)(x_1-x_2)} f(x_1) + \frac{2x-x_0-x_1}{(x_2-x_0)(x_2-x_1)} f(x_2)$

$P_2'(x_0) = \frac{2x_0-x_1-x_2}{(x_0-x_1)(x_0-x_2)} f(x_0) + \frac{x_0-x_2}{(x_1-x_0)(x_1-x_2)} f(x_1) + \frac{x_0-x_1}{(x_2-x_0)(x_2-x_1)} f(x_2)$

$P_2'(x_0) = \frac{-h-2h}{2h^2} f(x_0) + \frac{-2h}{-h^2} f(x_1) + \frac{-h}{2h^2} f(x_2)$

$P_2'(x_0) = \frac{-3h}{2h^2} f(x_0) + \frac{2h}{h^2} f(x_1) + \frac{-h}{2h^2} f(x_2)$

$P_2'(x_0) = \frac{1}{2h}(-3f(x_0) + 4f(x_1) - f(x_2))$

$P_2'(x_0) = \frac{1}{2h}(-3f(x) + 4f(x+h) - f(x+2h))$

~~d) $f'(x) = \frac{\sec^2(x)}{2\sqrt{\tan(x)}}$~~

e) $f'(x) = \frac{\sec^2(x)}{2\sqrt{\tan(x)}}$