Math 140 Worksheet 4 — Solution Key
Week 4 (through Wednesday)

1.
$$f'(a) = \lim_{h\to 0} \frac{(a+h)^2 + 3(a+h) - (a^2+3a)}{h}$$
$$= \lim_{h\to 0} \frac{2ah + h^2 + 3h}{h} = \lim_{h\to 0}(2a + h + 3) = 2a + 3.$$

2. (a) $28x^3 - 6x$

   (b) $\dfrac{1}{2\sqrt{x}} + 12x^2$

3. (a) $h'(x) = 10x - 4$, $h(1) = 1$, tangent line $y = 6x - 5$

   (b) $10x - 4 = 6 \Rightarrow x = 1$

4. (a) $f'(x) = 4x^3 - 8x$

   (b) $4x(x^2 - 2) = 0 \Rightarrow x = 0, \pm\sqrt{2}$