

HW 3.1

$$\begin{aligned}
 6) \quad f'(x) &= \lim_{h \rightarrow 0} \frac{[2(x+h)^3 - 5(x+h)] - [2x^3 - 5x]}{h} \\
 &= \lim_{h \rightarrow 0} \frac{2(x^3 + 3x^2h + 3xh^2 + h^3) - 5x - 5h - 2x^3 + 5x}{h} \\
 &= \lim_{h \rightarrow 0} \frac{6x^2h + 6xh^2 + 2h^3 - 5h}{h} = \lim_{h \rightarrow 0} (6x^2 + 6xh + 2h^2 - 5) \\
 &= 6x^2 - 5
 \end{aligned}$$

$$m = f'(-1) = 6(-1)^2 - 5 = 1$$

So, the tangent line is

$$\begin{aligned}
 y - 3 &= x + 1 \\
 \text{or } y &= x + 4
 \end{aligned}$$

$$\begin{aligned}
 20) \quad g(0) &= g'(0) = 0, & g'(-1) &= -1, \\
 & & g'(1) &= 3, & g'(2) &= 1
 \end{aligned}$$

