Section 9.4 Solutions 22, 29

#22] $f(x) = 4 - 6x$

1 $f(x+h) = 4 - 6(x+h) = 4 - 6x - 6h$

2 $f(x+h) - f(x) = 4 - 6x - 6h - (4 - 6x) = 4 - 6x - 6h - 4 + 6x$

$= -6h$

3 $\dfrac{f(x+h) - f(x)}{h} = \dfrac{-6h}{h} = -6$

4 $\lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h} = \lim_{h \to 0} -6 = -6$

#29] $f(x) = -x^2 + 5x + 1$

1 $f(x+h) = -(x+h)^2 + 5(x+h) + 1 = -(x^2 + 2xh + h^2) + 5x + 5h + 1$

$= -x^2 - 2xh - h^2 + 5x + 5h + 1$

2 $f(x+h) - f(x) = -x^2 - 2xh - h^2 + 5x + 5h + 1 - (-x^2 + 5x + 1)$

$+x^2 - 5x - 1$

$= -2xh - h^2 + 5h = h(-2x + 5 - h)$

3 $\dfrac{f(x+h) - f(x)}{h} = \dfrac{h}{h}(-2x + 5 - h) = -2x + 5 - h$

4 $\lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h} = \lim_{h \to 0} (-2x + 5 - h) = -2x + 5$