Section 2-7 Homework Help
#27

$$f'(a)=\lim_{h\to 0}\frac{f(a+h)-f(a)}{h}$$

$$=\lim_{h\to 0}\frac{\left[3(a+h)^2-4(a+h)+1\right]-\left[3a^2-4a+1\right]}{h}$$

$$=\lim_{h\to 0}\frac{\left[3\left(a^2+2ah+h^2\right)-4(a+h)+1\right]-\left[3a^2-4a+1\right]}{h}$$

$$=\lim_{h\to 0}\frac{\left[\cancel{3a^2}+6ah+3h^2\cancel{-4a}-4h\cancel{+1}\right]-\left[\cancel{3a^2}\cancel{-4a}\cancel{+1}\right]}{h}$$

$$=\lim_{h\to 0}\frac{6ah+3h^2-4h}{h}$$

$$=\lim_{h\to 0}\frac{6ah}{h}+\frac{3h^2}{h}-\frac{4h}{h}$$

$$=\lim_{h\to 0}6a+3h-4$$

$$=6a-4$$