

7. HA:  $y = \frac{5x^2}{x^2} = 5$

$y = 5$

VA:  $\frac{(5x+2)(x-3)}{(x+10)(x-3)}$

$x+10=0$   
 $x = -10$

8a.  $f'(a) = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$

8b.  $f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$

9.  $f'(a) = \lim_{h \rightarrow 0} \frac{6(a+h)^2 - 8(a+h) + 7 - (6a^2 - 8a + 7)}{h}$   
 $= \lim_{h \rightarrow 0} \frac{6(a^2 + 2ah + h^2) - 8a - 8h + 7 - 6a^2 + 8a - 7}{h}$   
 $= \lim_{h \rightarrow 0} \frac{6a^2 + 12ah + 6h^2 - 8h - 6a^2}{h}$   
 $= \lim_{h \rightarrow 0} \frac{h(12a + 6h - 8)}{h}$   
 $= \lim_{h \rightarrow 0} (12a + 6h - 8)$   
 $= 12a + 6(0) - 8$   
 $= 12a - 8$

10a.  $m = f'(25) = \lim_{x \rightarrow 25} \frac{f(x) - f(25)}{x - 25}$   
 $= \lim_{x \rightarrow 25} \frac{\sqrt{x} - 5}{x - 25}$   
 $= \lim_{x \rightarrow 25} \frac{(\sqrt{x} - 5)(\sqrt{x} + 5)}{(x - 25)(\sqrt{x} + 5)}$   
 $= \lim_{x \rightarrow 25} \frac{x - 25}{(x - 25)(\sqrt{x} + 5)}$   
 $= \lim_{x \rightarrow 25} \frac{1}{\sqrt{x} + 5}$   
 $= \frac{1}{\sqrt{25} + 5}$   
 $= \frac{1}{5 + 5}$   
 $= \frac{1}{10}$

10b.  $y - y_1 = m(x - x_1)$   
 $y - 5 = \frac{1}{10}(x - 25)$   
 $y - 5 = \frac{1}{10}x - \frac{25}{10}$   
 $y - 5 = \frac{1}{10}x - \frac{5}{2}$   
 $y = \frac{1}{10}x - \frac{5}{2} + 5$   
 $y = \frac{1}{10}x - \frac{5}{2} + \frac{10}{2}$   
 $y = \frac{1}{10}x + \frac{5}{2}$   
 or  
 $y = 0.1x + 2.5$