3. The slope at D is the largest positive slope, followed by the positive slope at E. The slope at C is zero. The slope at B is steeper than at A (both are negative). In decreasing order, we have the slopes at: D, E, C, A, and B.

5. (a) (i) Using Definition 1,

$$m = \lim_{x\to a}\frac{f(x)-f(a)}{x-a}\ \lim_{x\to -3}\frac{f(x)-f(-3)}{x-(-3)} = \lim_{x\to -3}\frac{(x^2+2x)-(3)}{x-(-3)} = \lim_{x\to -3}\frac{(x+3)(x-1)}{x+3}$$

$$= \lim_{x\to -3}(x-1) = -4$$

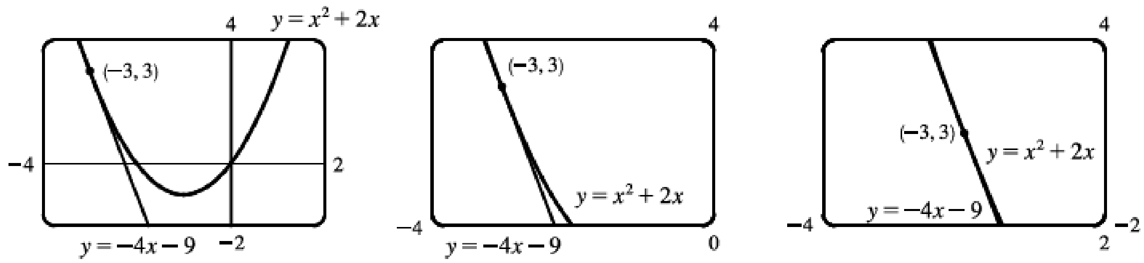
(ii) Using Equation 2,

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

$$= \lim_{h\to 0}\frac{9-6h+h^2-6+2h-3}{h} = \lim_{h\to 0}\frac{h(h-4)}{h} = \lim_{h\to 0}(h-4) = -4$$

(b) Using the point-slope form of the equation of a line, an equation of the tangent line is $y-3=-4(x+3)$. Solving for y gives us $y=-4x-9$, which is the slope-intercept form of the equation of the tangent line.

(c)

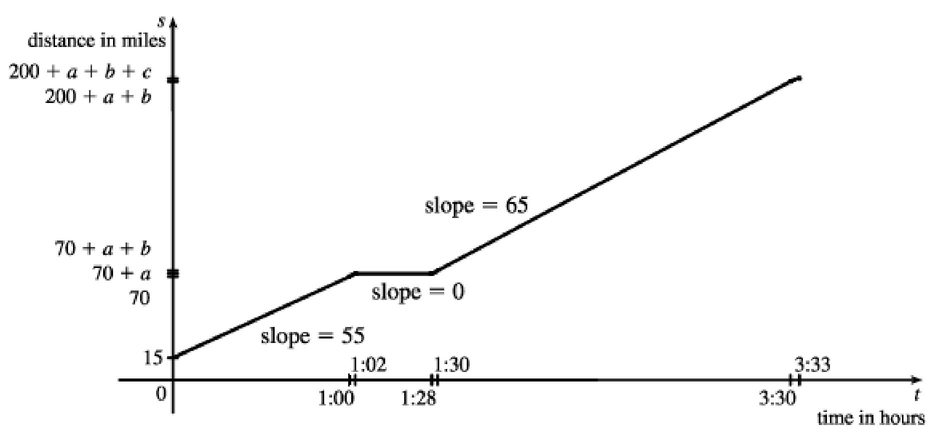


7. Using (1) with $f(x)=\dfrac{x-1}{x-2}$ and $P(3,2)$,

$$m = \lim_{x\to a}\frac{f(x)-f(a)}{x-a} = \lim_{x\to 3}\frac{\frac{x-1}{x-2}-2}{x-3} = \lim_{x\to 3}\frac{\frac{x-1-2(x-2)}{x-2}}{x-3} = \lim_{x\to 3}\frac{3-x}{(x-2)(x-3)} = \lim_{x\to 3}\frac{-1}{x-2} = \frac{-1}{1} = -1.$$

Tangent line: $y-2=-1(x-3) \quad\Leftrightarrow\quad y-2=-x+3 \quad\Leftrightarrow\quad y=-x+5$

14. Let a denote the distance traveled from 1:00 to 1:02, b from 1:28 to 1:30, and c from 3:30 to 3:33, where all the times are relative to $t=0$ at the beginning of the trip.



17. Let $s(t) = 40t - 16t^2$.

$$v(2) = \lim_{t \to 2} \frac{s(t) - s(2)}{t - 2} = \lim_{t \to 2} \frac{\left(40t - 16t^2\right) - 16}{t - 2} = \lim_{t \to 2} \frac{-16t^2 + 40t - 16}{t - 2} = \lim_{t \to 2} \frac{-8\left(2t^2 - 5t + 2\right)}{t - 2}$$

$$= \lim_{t \to 2} \frac{-8(t-2)(2t-1)}{t-2} = -8 \lim_{t \to 2}(2t - 1) = -8(3) = -24$$

Thus, the instantaneous velocity when $t = 2$ is -24 ft/s.