

2007 Form B AB3

A. $w'(20) = -0.285$ or -0.286 . This shows that the wind chill temperature is decreasing at a rate of 0.285 degrees F/mph.

B.

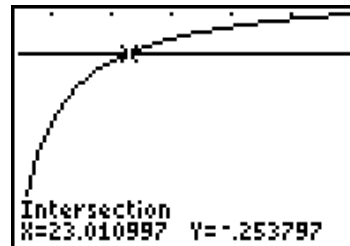
$$W_{avg} = \frac{w(60) - w(5)}{60 - 5} =$$

$$-0.253797 \text{ or } -0.253 \text{ or } -0.254$$

$$w'(v) = 22.1(0.16)v^{-0.84}$$

$$-0.253 = 22.1(0.16)v^{-0.84}$$

Graphically this solution is at $v = 23.011$ miles per hour.



C.

$$\frac{dw}{dv} = (22.1)(0.16)v^{-0.84}, \frac{dv}{dt} = 5$$

$$v = 20 + 5t$$

$$\frac{dw}{dt} = \frac{dw}{dv} \cdot \frac{dv}{dt}$$

$$\frac{dw}{dt} = 3.536v^{-0.84} \cdot 5 = 17.68v^{-0.84} = 17.68(20 + 5t)^{-0.84} \Big|_{t=3}$$

$$= 0.892 \text{ } ^\circ\text{F} / \text{hour}$$

Or

$$w(v) = 55.6 - 22.1v^{0.16}$$

$$v = 20 + 5t$$

$$w(t) = 55.6 - 22.1(20 + 5t)^{0.16}$$

$$w'(t) = (22.1)(0.16)(20 + 5t)^{-0.84} \cdot 5$$

$$w'(t) = 17.68(20 + 5t)^{-0.84}$$

$$w'(3) = 17.68(20 + 5 \cdot 3)^{-0.84} = 17.68(35)^{-0.84} \text{ } ^\circ\text{F} / \text{hour}$$

$$= 0.892 \text{ } ^\circ\text{F} / \text{hr}$$