(13) $s = 3t^2 - 4t$ m

$v = 6t - 4$ m/s

$v(2) = 8$ m/s

(15) $s = 48t + 12$ m

$v = 48$ m/s

(19) We'll use the limit definition since the function is not a polynomial.

Let $f(x) = 3x - \frac{6}{5x}$

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

$$= \lim_{h\to 0} \frac{1}{h}\left[3(x+h) - \frac{6}{5(x+h)} - 3x + \frac{6}{5x}\right]$$

$$= \lim_{h\to 0} \frac{1}{h}\left[3x + 3h - 3x + \frac{-6x + 6(x+h)}{5(x+h)x}\right]$$

$$= \lim_{h\to 0} \frac{1}{h}\left[3h + \frac{-6x + 6x + 6h}{5(x+h)x}\right]$$

$$= \lim_{h\to 0} \frac{1}{h}\left[3h + \frac{6h}{5(x+h)x}\right]$$

$$= \lim_{h\to 0} 3 + \frac{6}{5(x+h)x}$$

$$= 3 + \frac{6}{5x^2}$$ →

$$s = 3t - \frac{6}{\sqrt{t}} \quad \text{m}$$

$$v = 3 + \frac{6}{5t^2} \quad \text{m/s}$$

(23) $s = t^3 + 15t$ m

$v = 3t^2 + 15$ m/s

$a = 6t$ m/s^2

(27) $s = 44.0t - 4.90t^2$ m

$v = 44.0 - 9.80t$ m/s

Set $v = 0$:

$$44.0 - 9.80t = 0$$

$$-9.80t = -44.0$$

$$t = \frac{-44.0}{-9.80}$$

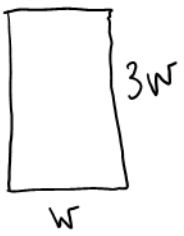
$$\approx 4.49 \text{ s}$$

(29) $q = 30 - 2t$ (coulombs)

$i = -2$ (amperes)

You can omit the units since they were not given in the question.

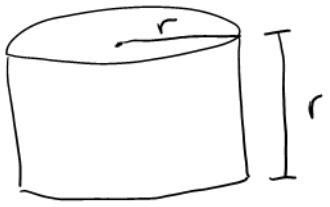
(31)



$$A = 3w^2$$

$$\frac{dA}{dw} = 6w \qquad \frac{cm^2}{cm}$$

23.5 #45



$$V = \pi r^2 h$$

$$V = \pi r^3$$

$$\frac{dV}{dr} = 3\pi r^2 \qquad \frac{cm^3}{cm}$$