

27.5

$$(3) \quad y = \log x^2$$

$$y = \log_{10} x^2$$

$$y' = \frac{1}{\ln 10} \cdot \frac{1}{x^2} (2x)$$

$$= \frac{2}{\ln 10} \cdot \frac{1}{x}$$

$$(5) \quad y = 4 \log_5 (3-x)$$

$$y' = 4 \cdot \frac{1}{\ln 5} \cdot \frac{1}{3-x} (-1)$$

$$= \frac{-4}{\ln 5} \cdot \frac{1}{3-x}$$

$$\text{or} \quad \frac{4}{\ln 5} \cdot \frac{1}{x-3}$$

$$(7) \quad u = 8 \ln(3-x)$$

$$u' = 8 \frac{1}{3-x} (-1)$$

$$= \frac{-8}{3-x} \quad \text{or} \quad \frac{8}{x-3}$$

$$(9) \quad y = 2 \ln \tan 2x$$

$$y' = 2 \frac{1}{\tan 2x} [\sec^2 2x (2)]$$

$$= \frac{4 \sec^2 2x}{\tan 2x}$$

$$(13) \quad y = \ln(x - x^2)^3$$

$$y = 3 \ln(x - x^2)$$

$$y' = 3 \frac{1}{x - x^2} (1 - 2x)$$

$$= \frac{3(1 - 2x)}{x - x^2}$$

$$(17) \quad y = 3x \ln(6 - x)$$

$$y' = 3x \frac{1}{6 - x} (-1) + \ln(6 - x) (3)$$

$$= \frac{-3x}{6 - x} + 3 \ln(6 - x)$$

$$(19) \quad y = \ln(\ln x)$$

$$y' = \frac{1}{\ln x} \left(\frac{1}{x} \right)$$

$$= \frac{1}{x \ln x}$$

$$(23) \quad y = \sin(\ln x)$$

$$y' = \cos(\ln x) \frac{1}{x}$$

$$= \frac{\cos(\ln x)}{x}$$

(45)

$$y = \tan^{-1} 2x + \ln(4x^2 + 1)$$

$$y' = \frac{1}{1+(2x)^2} \cdot (2) + \frac{1}{4x^2+1} (8x)$$

$$= \frac{2}{1+4x^2} + \frac{8x}{4x^2+1} \quad \text{or} \quad \frac{2+8x}{1+4x^2}$$

$$y' \Big|_{x=0.625} \approx 2.73$$