Find the derivative of the given function.

10) $y = \tan^{-1}\sqrt{3x}$

$$\frac{d}{dx}\tan^{-1}(u) = \frac{1}{1+u^2}\cdot u'$$

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

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

$$\frac{dy}{dx} = \frac{1}{1+\left((3x)^{\frac{1}{2}}\right)^2} = \left(\frac{1}{1+3x}\right)\left(\frac{3}{2(3x)^{\frac{1}{2}}}\right)$$

10) ______________

Find dy/dx.

11) $f(x) = -4e^{3x}$

11) ______________

12) $y = 11^{-x}$

12) ______________

13) $y = \ln(x - 2)$

13) ______________

n function.

$$\frac{d}{dx}\left[e^u\right] = e^u \cdot u'$$

$$u = 3x \quad u' = 3$$

$$f'(x) = -4\left(e^{3x}\right)\cdot 3$$

$$= -12e^{3x}$$

n function.

$$\frac{d}{dx}[a^u] = \underline{a^u}\,\underline{\ln a} \cdot \underline{u'}$$

$u = -x \quad u' = -1$

$$y' = \underline{11^{-x}}\,\underline{\ln 11} \cdot \underline{(-1)}$$

$$= -\ln 11\,(11^{-x})$$

10) .

11) .

12) .

13) .

13) $y = \ln(x - 2)$ 13) ____________

13

$$\frac{d}{dx}[\ln u] \quad \frac{1}{u} \cdot u' = \frac{u'}{u}$$

1

$u = x - 2 \qquad u' = 1$

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

se logarithmic differentiation to find dy/dx.

14) $y = 12^{9x}$

14

$$\frac{d}{dx}[a^u] = a^u \cdot \ln a \cdot u'$$

$a = 12 \qquad u = 9x \qquad u' = 9$

$$y' = 12^{9x} \cdot \ln 12 \cdot 9$$

ind f'(x) and state the domain of f'(x).

15) $f(x) = \log_4 \sqrt{7x + 6}$

Solve the problem.

16) Suppose that the amount in grams of a radioactive substance present at time t (in years) is given by $A(t) = 160e^{-.70t}$. Find the rate of decay of the quantity present at the time when t = 4.

16) ______________

15

$$\frac{d}{dx}\left[\log_a u\right] = \frac{1}{u \ln a} \cdot u'$$

$$a = 4 \qquad u = (7x+6)^{1/2}$$

$$u' = \frac{1}{2}(7x+6)^{-1/2} \cdot 7$$

$$f'(x) = \frac{1}{(7x+6)^{1/2} \ln 4} \cdot \left(\frac{1}{2}(7x+6)^{-1/2} \cdot 7\right)$$

Solve the problem.

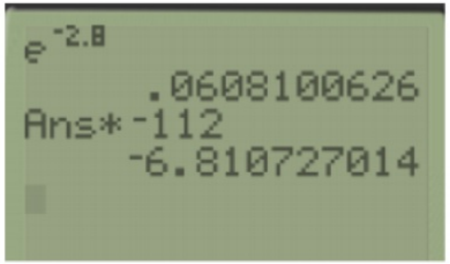
16) Suppose that the amount in grams of a radioactive substance present at time t (in years) is given by $A(t) = 160e^{-.70t}$. Find the rate of decay of the quantity present at the time when t = 4.

16) ______________

derive!

$$A(t) = 160e^{\underbrace{-.70t}_{=u}}$$

$$u' = -.70$$



$$A'(t) = 160e^{-.70t}\cdot(-.70)$$

$$A'(4) = 160e^{-.70(4)}(-.70)$$

$$= -112e^{-2.8} \approx -6.8$$