

15)

$$dy = (3x^2 - 3)dx$$

$$dy = (3(2^2) - 3)0.05 = 0.45$$

16)

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

$$dy = \left(\frac{2-2(-2)^2}{(1+(-2)^2)^2} \right) 0.1 = \left(\frac{-6}{5^2} \right) 0.1 = \frac{-6}{25} \left(\frac{1}{10} \right) = \frac{-3}{125} = -0.024$$

17)

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

$$dy = (1 + 2(1) \ln 1) 0.01 = 0.01$$

18)

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

$$dy = (0+1)(-0.2) = -0.2$$

19)

$$dy = (e^{\sin x} (\cos x)) dx$$

$$dy = (e^{\sin \pi} (\cos \pi)) (-0.1) = 0.1$$

20)

$$dy = \left(-3 \csc \left(1 - \frac{x}{3} \right) \cot \left(1 - \frac{x}{3} \right) \left(-\frac{1}{3} \right) \right) dx = \left(\csc \left(1 - \frac{x}{3} \right) \cot \left(1 - \frac{x}{3} \right) \right) dx$$

$$dy = \left(\csc \left(\frac{2}{3} \right) \cot \left(\frac{2}{3} \right) \right) 0.1 \approx 0.206$$

21)

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

$$dy = \left(\frac{1}{1+0^2} \right) 0.01 = 0.01$$

22)

$$y(2+x) = x^2 \Rightarrow y = \frac{x^2}{2+x} \Rightarrow dy = \left(\frac{(2+x)(2x) - x^2(1)}{(2+x)^2} \right) dx = \left(\frac{4x + x^2}{(2+x)^2} \right) dx$$

$$dy = \left(\frac{8+4}{(2+2)^2} \right) (-0.05) = \frac{12}{16} (-0.05) = -0.0375$$

$$23) \quad dy = \frac{1}{2} (1-x^2)^{-1/2} (-2x) dx = \frac{-x}{\sqrt{1-x^2}} dx$$

$$24) \quad dy = (5e^{5x} + 5x^4) dx$$

$$25) \quad dy = \frac{1}{1+(4x)^2} (4) dx = \frac{4}{1+16x^2} dx$$

$$26) \quad dy = (8^x \ln 8 + 8x^7) dx$$

31)

$$dV = 4\pi r^2 dr$$

$$dV = 4\pi (10)^2 (.05) = 20\pi \text{ cm}^3$$

32)

$$dS = 8\pi r dr$$

$$dS = 8\pi (10) (.05) = 4\pi \text{ cm}^2$$

33)

$$dV = 3x^2 dx$$

$$dV = 3(10)^2 (.05) = 15 \text{ cm}^3$$

34)

$$dS = 12x dx$$

$$dS = 12(10) (.05) = 6 \text{ cm}^2$$