8. $x = 2\ln(y^2-3)$; $(0,4)$

$$1 = 2 \cdot \frac{1}{y^2-3} \cdot 2y \frac{dy}{dx}$$

$$1 = 2 \cdot \frac{1}{16-3} \cdot 8 \frac{dy}{dx}$$

$$1 = \frac{16}{13}\frac{dy}{dx}$$

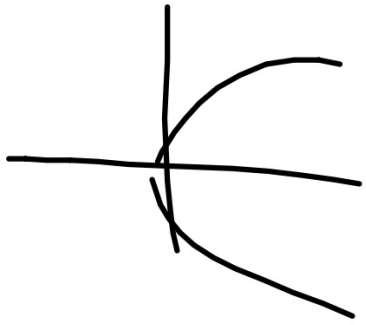
$$\frac{13}{16} = \frac{dy}{dx}$$

8. $y = \frac{1}{1+x}$

$x = \frac{1}{1+y}$

$1+y = \frac{1}{x}$

$y = \frac{1}{x} - 1 = \frac{1-x}{x}$



$y = x \ln^3 x$

$y = 3x \ln x$

$3 \ln x + 3x \cdot \frac{1}{x}$

$3 \ln x + 3$

$y = \ln \cos x^2$

$u = x^2 \quad y = \cos u$

$du = 2x \quad dy = -\sin u$

$-2x \sin x^2$

$du =$

$u = \cos x^2 \quad y = \ln u$

$dy = \frac{1}{u}$

$-2x \sin x^2 \cdot \frac{1}{\cos x^2}$

$$\int \frac{8x-24}{(x^2-6x+5)^{1/3}}\,dx = 4\int u^{-1/3}\,du$$

$u = x^2-6x+5$

$du = 2x-6$

5.4A e

WCID? I can work with e

A. $e \approx 2.72$

1. e^x is an exponential function

2. Properties

a. $\ln(e^x) = x$

b. $e^{\ln x} = x$

Ex. $\ln 7 = \ln e^{x+1}$

$\ln 7 = x+1$

$\ln 7 - 1 = x$

$x \approx .946$

Ex $\frac{16}{8} = \frac{8e^{x-3}}{8}$

$\ln 2 = \ln e^{x-3}$

$\ln 2 = x - 3$

$\ln 2 + 3 = x$

$3.693 = x$

Ex. $\ln 5 = \ln 4^{x+1}$

$$\frac{\ln 5}{\ln 4} = \frac{(x+1)\ln 4}{\ln 4}$$

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

Ex. $e^{\ln(2x-3)} = e^{5}$

$2x-3 = e^{5}$

$x \approx 75.707$

Ex. $72 = 4\ln(4x-5)^2$

$$e^{9} = e^{\ln(4x-5)}$$

$$\frac{e^{9}+5}{4} = x$$

B. The Derivative

1. $\frac{d}{dx}[e^x] = e^x$

2. $\frac{d}{dx}[e^u] = e^u \cdot du$

Ex. $e^{7x} = 7e^{7x}$

Ex. $e^{x^2+3x} = (2x+3)e^{x^2+3x}$

Ex. $e^{\sin(5x)} = 5\cos(5x)e^{\sin(5x)}$

P. 356

2-10 Even

33, 34

35-47 odd

49, 51