

$$40. \frac{dr}{dt} = \frac{\sec^2 t}{\tan t + 1} \quad (\pi, 4)$$

$$dr = \frac{\sec^2 t}{\tan t + 1} dt$$

$$dr = \frac{1}{u} du$$

$$u = \tan t + 1$$

$$r = \ln|u| + C$$

$$du = \sec^2 t dt$$

$$r = \ln|\tan t + 1| + C$$

$$4 = \ln|0 + 1| + C$$

$$4 = C$$

$$\underline{\underline{71.}} \quad y = \frac{x^2 + 4}{x} \quad x=1, x=4, y=0$$

$$\int \frac{x^2}{x} + \frac{4}{x} dx$$

$$\int_1^4 x + \frac{4}{x} dx$$

$$\left. \frac{x^2}{2} + 4 \ln x \right|_1^4$$

$$\left( 8 + 4 \ln 4 \right) - \left( \frac{1}{2} + 0 \right)$$



$$6. \int 4 \underline{\sec 4x \tan 4x} \underline{\sec^4 4x} dx$$

$$u = \sec 4x$$

$$du = \underline{4 \sec 4x \tan 4x} dx$$

$$\int u^4 du$$

$$\sec^4 4x$$

$$\left( \sec 4x \right)^4$$

↗  $\sin 5x$

$\cos 5x$

$$5. \int \frac{(5 + \ln x)^5}{x} dx$$

$$u = 5 + \ln x$$

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

$$\int u^5 du$$

## 5.3 Inverse Functions

WCID? I can evaluate inverse functions

A.  $f(x) = 2x + 3$       $g(x) = \frac{x-3}{2}$

$f(1) = 5$       $g(5) = 1$

1.  $f(x)$  and  $g(x)$  are inverses of each other

$$f(g(x)) = 2\left(\frac{x-3}{2}\right) + 3$$

$$= x$$

2.  $f^{-1}(x)$  is an inverse

B. How to find  $f^{-1}(x)$

1. Switch  $x$  and  $y$

2. Solve for  $y$

$$\text{Ex. } y = 5x + 8$$

$$x = 5y + 8$$

$$\frac{x-8}{5} = \frac{5y}{5}$$

$$\frac{x-8}{5} = y$$



$$\text{Ex } f(x) = x^3$$

$$y = x^3$$

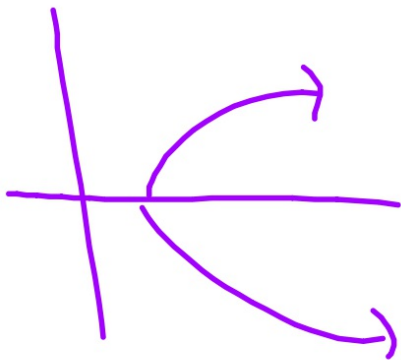
$$x = y^3$$

$$\sqrt[3]{x} = y$$

C. Is  $f^{-1}(x)$  a function

$$y = x + 4$$

✓



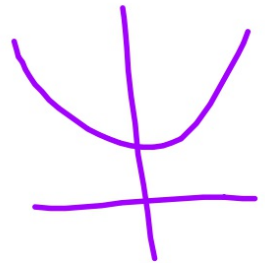
$$y = x^2 + 3$$

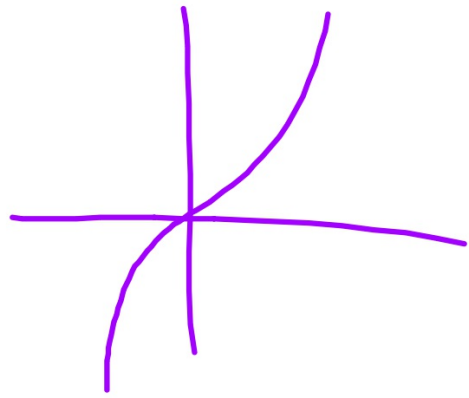
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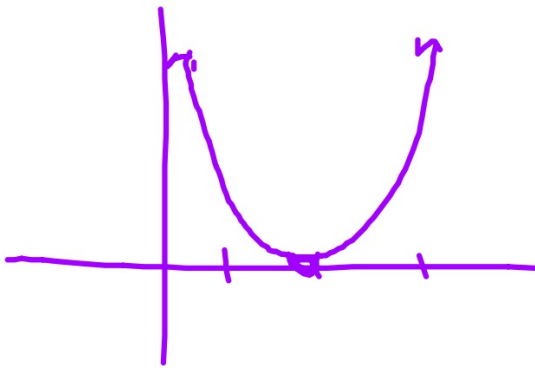
$$x = y^2 + 3$$

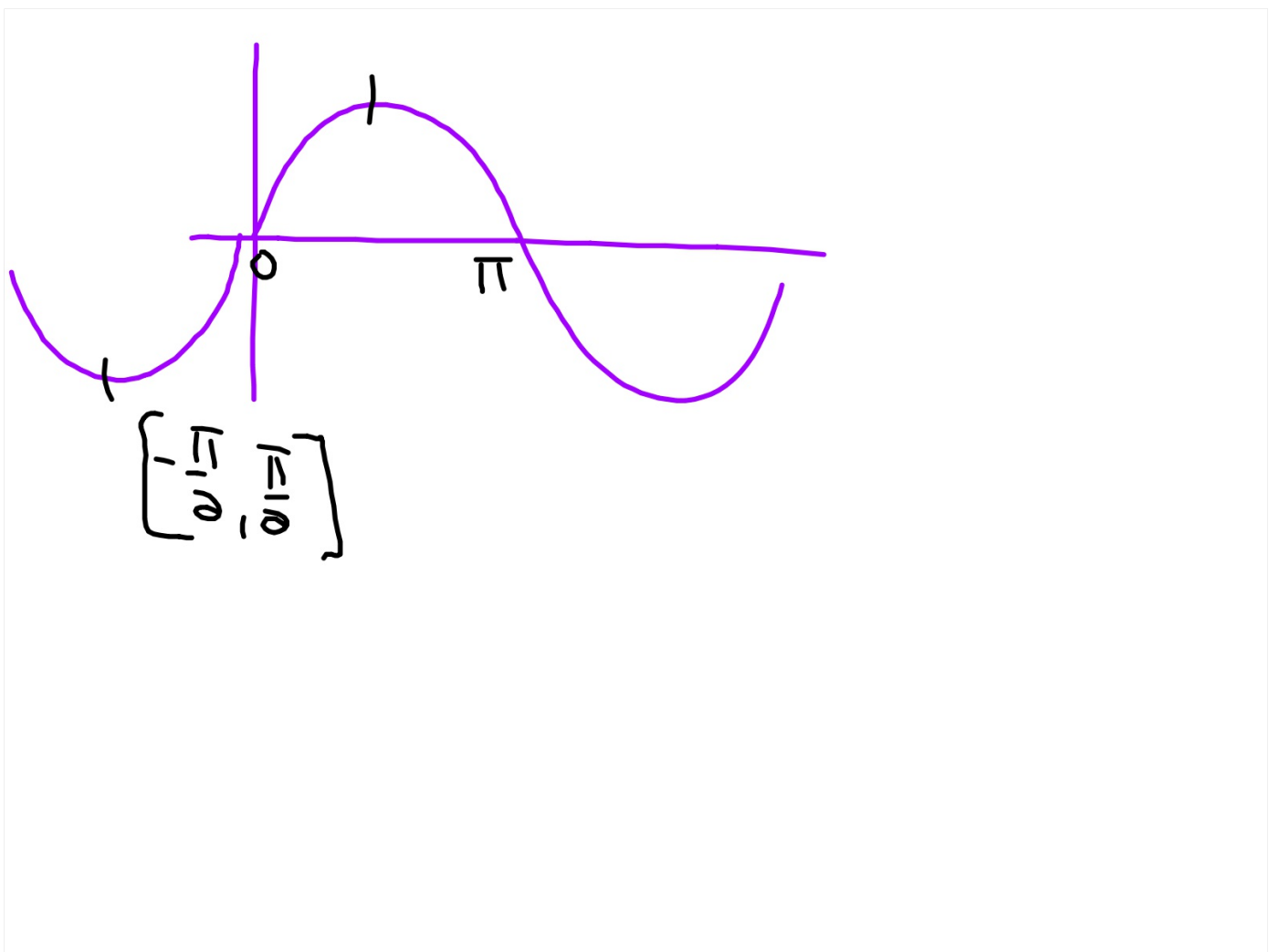
$$x - 3 = y^2$$

$$\pm \sqrt{x-3} = y$$









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1, 4, 8, 9-12, 29-36

81, 82