

1. Without doing a bunch of algebra, find $f^{-1}(x)$ for each function below:

(a) $f(x) = 2x$

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

(b) $f(x) = x^3$

$$f^{-1}(x) = \sqrt[3]{x}$$

2. Without explicitly finding a formula for $f^{-1}(x)$, find $f^{-1}(1)$ for each function below:

(a) $f(x) = x - 20$

What input gives an output of 1?
Answer: $f^{-1}(1) = 21$

(b)

x	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2.0
$f(x)$	20	10	5	3	2.5	2	1.5	1	0.25

What input gives an output of 1?
Answer: $f^{-1}(1) = 1.75$

3. Evaluate $\sin^{-1}(1)$.

$$\sin^{-1}(1) = \theta \Rightarrow \sin(\theta) = 1. \text{ So } \theta = \frac{\pi}{2}$$



4. Find the exact value of each expression.

(a) $\log_2 16$

$$\log_2(16) = y \Leftrightarrow 2^y = 16$$

$$\text{So } y = 4 \Rightarrow \boxed{\log_2(16) = 4}$$

(b) $e^{\ln 5}$

$$\boxed{e^{\ln(5)} = 5}$$

5. Solve each equation below for x .

(a) $10 = 2e^{x+1}$

$$5 = \frac{10}{2} = e^{x+1} \Rightarrow$$

$$\ln(5) = x+1 \Rightarrow$$

$$\boxed{x = \ln(5) - 1}$$

(b) $\ln(x^2 - 1) = 1$

$$\ln(x^2 - 1) = 1 \Rightarrow$$

$$e^{\ln(x^2 - 1)} = e^1 \Rightarrow$$

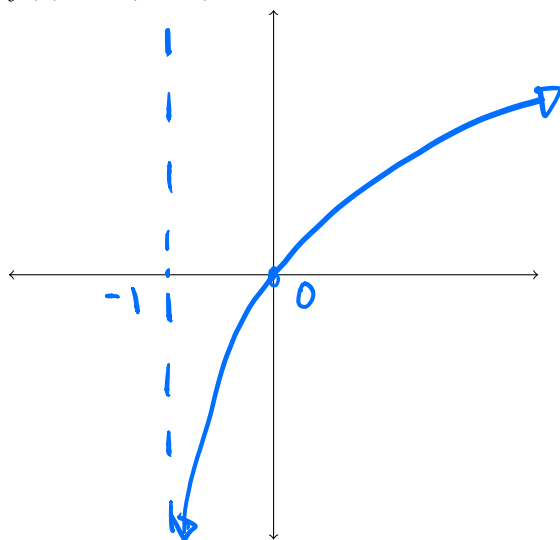
$$x^2 - 1 = e \Rightarrow$$

$$x^2 = e + 1$$

$$\text{so } \boxed{x = \sqrt{e+1} \text{ or } x = -\sqrt{e+1}}$$

6. Sketch each function. Include domain, range, intercepts and asymptotes.

(a) $f(x) = \ln(x+1)$



(shift \leftarrow by 1)

Note $\ln(1) = 0$ because $e^0 = 1$

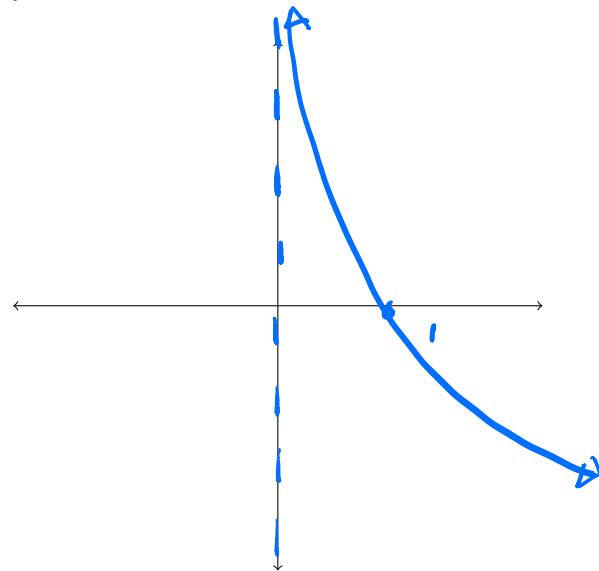
VA: $y = -1$

Domain: $(-1, \infty)$

range = $(-\infty, \infty)$

x-intercept
at $(0,0)$
No y-int.

(b) $f(x) = -\ln x$



(flip \updownarrow)

VA = $y = 0$

Domain: $(0, \infty)$

Range: $(-\infty, \infty)$

x-intercept at $(1,0)$

No y-intercept