# REVIEW DAY 4: INVERSE FUNCTION, EXPONENTIAL FUNCTIONS, & LOGARITHMIC FUNCTIONS

1. In your own words, explain what it means for $f^{-1}(x)$ to be the *inverse* of $f(x)$? You might try explaining it using graphs, algebra, or numerical calculations.

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

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

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

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

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

   (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 |

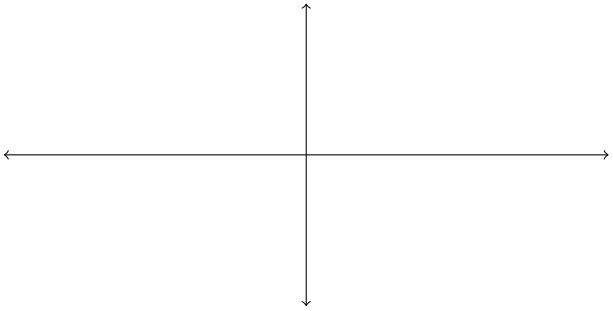
4. Explain why the directions "Find $f^{-1}(1)$" don't make sense for the following examples:

   (a) $f(x) = x^2 - 3$

   (b)

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| $f(x)$ | -3 | 1 | 5 | 8 | 6 | 2 | 3 | 1 | 0 |

5. Give a not-too-big rough sketch of $f(x) = \sin x$ and ask yourself whether or not it makes since to be asked to find $\sin^{-1}(1)$. (Recall that $\sin^{-1}(1)$ could be written $\arcsin(1)$ or invsin$(1)$.)



6. Evaluate the following:

   (a) $\arcsin(1)$

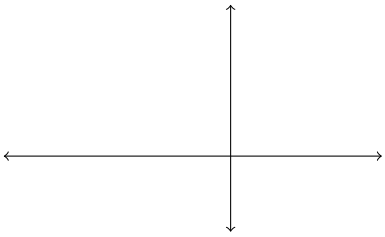
   (b) $\arccos(-\sqrt{3}/2)$

   (c) $\arctan(1)$

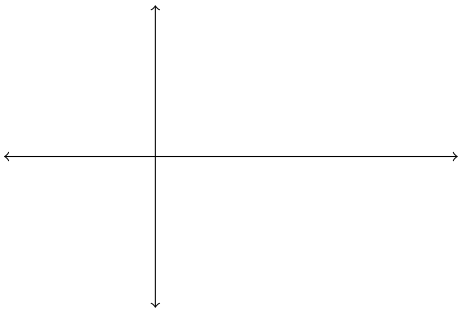
   (d) $\arcsin(10)$

7. On the axes below, sketch:

   (a) $y = e^x$ and $y = 2^x$



   (b) $y = \ln x$ and $y = \log_2(x)$



8. Find the exact value of each expression.

   (a) $\log_2 16$

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

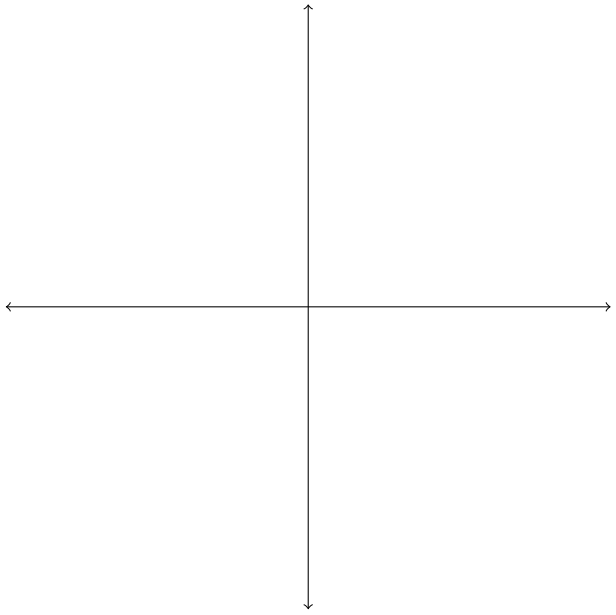
9. Solve each equation below for $x$.

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

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

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

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



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