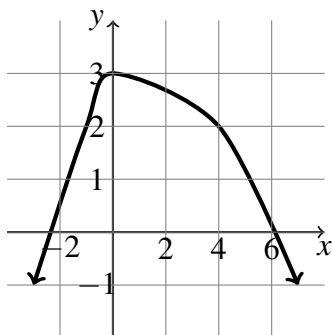


**Directions:**

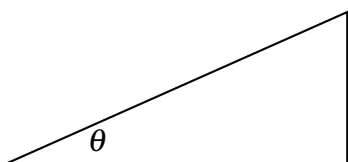
- You should be able to answer all of these questions without the use of a calculator.
- You must show your work or demonstrate your reasoning to earn full credit. If you only write down the answer, you will only earn half-credit.
- For all graphing questions, your graph must be labeled. This includes labelling the axes, asymptotes, and at least a couple of points.

1. Evaluate  $4^{-3/2}$ .
2. Find the exact value of  $\log_3 \frac{1}{27}$ .
3. Find the exact value of  $\sin(4\pi/3)$ .
4. Simplify the expression  $\left(\frac{4x^3y}{x^5y^{7/2}}\right)^2$ . Write your answer without negative exponents.
5. Write an equation in slope-intercept form  $y = mx + b$  for the line that passes through the points  $(-3, 7)$  and  $(3, -9)$ .
6. Expand and simplify  $(5x + 1)^2 - 8(x - 2)$ .
7. Use the graph of  $f(x)$  below to estimate the value(s) of  $x$  such that  $f(x) = 2$ .



8. For the function  $f(x) = \frac{2}{x}$ , find the expression  $f(12 + h) - f(12)$ . Simplify your answer and write your answer as a single fraction.
9. Given the piecewise defined function below, determine the value(s) of  $x$  such that  $f(x) = -20$ .
$$f(x) = \begin{cases} 2x + 3 & x < 0 \\ x^3 & x \geq 0 \end{cases}$$
10. Solve for  $x$  in the equation  $x^2 + 3x = 10$ .
11. Solve for  $x$  in the equation  $e^{4-7x} = \frac{1}{2}$ .

12. Find all solutions to the equation  $2\cos(\theta) = 1$  in the interval  $[0, 2\pi]$ .
13. A table of values for the function  $f(x)$  is given below. Use the table to determine  $f^{-1}(5)$ .
- |        |     |    |    |    |    |    |    |    |      |
|--------|-----|----|----|----|----|----|----|----|------|
| $x$    | -5  | 0  | 5  | 10 | 15 | 20 | 25 | 30 | 35   |
| $f(x)$ | 100 | 50 | 25 | 10 | 5  | 2  | 1  | -1 | -1/5 |
14. Solve the inequality  $16 - x^2 \leq 0$ . Give your answer in interval notation.
15. Determine the domain of  $f(x) = \ln(x - 4)$ . Give your answer in interval notation.
16. In the triangle below,  $\sin \theta = \frac{2}{5}$ . Determine  $\cos \theta$ .



Sketch graphs of the following functions. Label the  $x$ - and  $y$ -intercepts, if they exist. Draw in any asymptotes using dashed lines, and write the equation of the asymptote, if it exists.

17.  $f(x) = (x + 1)^3$
18.  $f(x) = 1 + e^x$
19.  $y = \cos(x)$  on the interval  $[-2\pi, 2\pi]$
20. Given the graph of  $f(x)$  below, draw the graph of  $-2f(x)$ .

