

Name: _____ / 40

There are 16 questions worth 40 points on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.** Give **exact** numerical answers such as $\sqrt{7}$ or $\frac{5}{\pi}$.

Algebra

1. [2 points] Simplify each expression below.

- a. Write the expression $\frac{(xyz)^3}{x^4y^{-2}z}$ in the form $x^a y^b z^c$. That is, write the expression with all terms in the numerator.

- b. Cancel any common factors in both the numerator and denominator for the expression $\frac{2xy^2 + 4y^3}{3x^2 + 6xy}$.

2. [2 points] Solve the following equations for x (giving exact answers).

a. $5^x + 1 = 12$.

b. $\ln(x+3) = \frac{1}{2}$.

3. [3 points] Solve the inequality $x^2 < 4$ for x . Write your answer in interval notation.

Geometry and Trigonometry

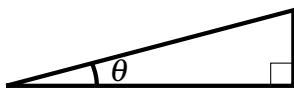
4. [2 points] A circular field has an area of 83 square feet. Determine its radius. Include units with your answer.

5. [2 points] Write an equation of the line between the points $(-3, 2)$ and $(4, 0)$.

6. [1 point] Evaluate $\sin(5\pi/6)$ exactly.

7. [2 points] Solve the equation $\cos(x) = 0$ on the interval $0 \leq x < 2\pi$. Give your answer in **radians**.

8. [2 points] In the right triangle below, $\sin(\theta) = \frac{1}{4}$. Determine $\tan(\theta)$.



$$\tan(\theta) = \underline{\hspace{2cm}}$$

Functions

9. [2 points] Determine the domain and range of $f(x) = 3 + \sqrt{x}$. Write your answer in interval notation.

domain: _____

range: _____

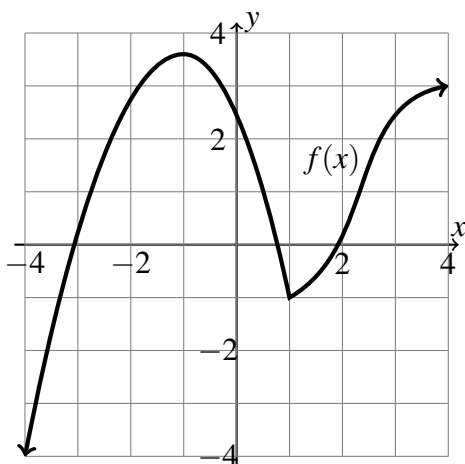
10. [2 points] For $f(x) = x - x^2$, find $f(a+2)$. Simplify your answer by multiplying out and collecting like terms.

11. [2 points] Use the piecewise defined function $f(x) = \begin{cases} x+1 & x \leq 0 \\ \frac{1}{x} & x > 0 \end{cases}$.

a. Find $f(-2.4)$.

b. Determine x such that $f(x) = 4$.

12. [3 points] Use the graph of $f(x)$ below to answer the questions.



a. Estimate $f(3)$.

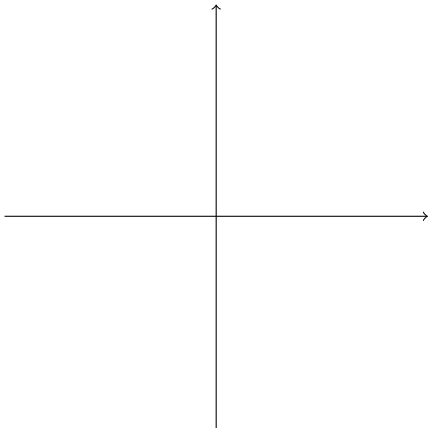
b. Estimate an x -value such that $f(x) = -2$.

c. On the interval from $x = 1$ to $x = 3$, is $f(x)$ increasing, decreasing, or constant?

Graphing

For problems 13-16, graph each function on the axes provided. Draw any asymptotes with dashed lines. Fill in the blanks identifying any x - or y -intercepts and the **equations** of any asymptotes. Write **none** if no intercepts or asymptotes exist.

13. [4 points] $f(x) = 4 - x^2$.

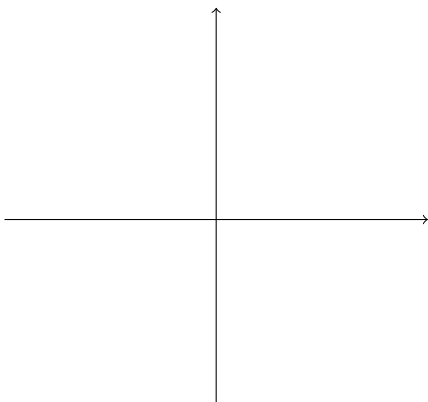


x intercepts: _____

y -intercepts: _____

asymptote(s): _____

14. [4 points] $f(x) = e^x + 2$

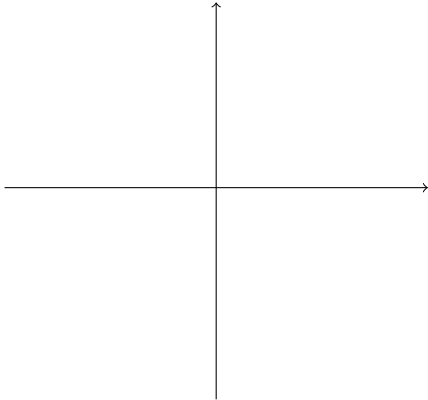


x intercepts: _____

y -intercepts: _____

asymptote(s): _____

15. [4 points] $f(x) = \ln(x - 3)$



x intercepts: _____

y -intercepts: _____

asymptote(s): _____

16. [4 points] $f(x) = -\cos(x)$ on the interval $0 \leq x \leq 3\pi$.



x intercepts: _____

y -intercepts: _____

asymptote(s): _____