Name: _____ _____ / **25**

There are 18 questions worth 25 points on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. [1 points] Determine the domain and range of $f(x) = \frac{1}{x^2} + 5$. Write your answers in interval notation.

Domain: _____ Range: _____

2. [1 points] For $f(x) = 8 - x^2$ and $g(x) = 3 + x$, find the composition $f \circ g$ and simplify your answer.

_____

3. [1 points] Write the expression $\dfrac{x^5 y^8}{x^3 y^{-1} z^2}$ in the form $x^a y^b z^c$. (That is, write the expression with all terms in the numerator.)

_____

4. [1 points] A rectangle has a width w that is twice its length, ℓ. Find an expression for the area, A, of the rectangle in terms of its length, ℓ.

_____

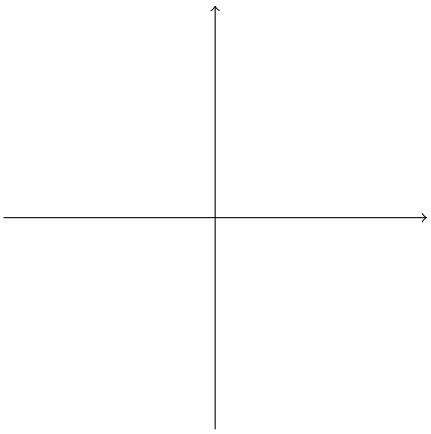
5. [2 points] Write an equation of the line between the points $(5, -7)$ and $(2, 1)$.

_____

Is the line increasing, decreasing, horizontal or vertical? _____

6. [1 points] Simplify the expression $\dfrac{2x^3+2x^2y}{4x^2+12xy}$ by cancelling all common factors in both the numerator and denominator.

7. [2 points] Sketch the graph of $f(x) = 16 - x^2$. Label any x- or y-intercepts in your sketch.



8. [2 points] Use the piecewise defined function $f(x) = \begin{cases} x^3 & x \leq 0 \\ \frac{x}{x+1} & x > 0 \end{cases}$.

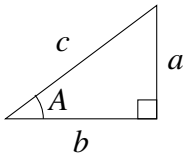
a. Find $f(10)$.

b. Determine x such that $f(x) = -8$.

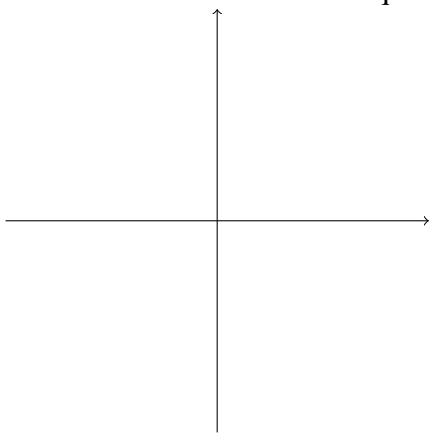
9. [1 points] Evaluate $\sin(5\pi/6)$ exactly.

10. [1 points] Solve the equation $\sin(x) + 1 = 0$ on the interval $0 \leq x < 2\pi$.

11. [1 points] In the right triangle below, $a = 1$ and $c = 4$. Determine the value of the tangent function at angle A.



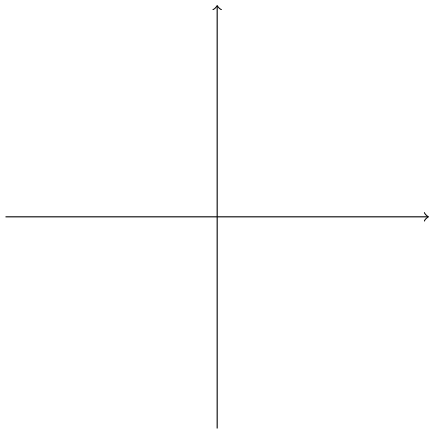
12. [2 points] Sketch the graph of $f(x) = e^x - 1$. Label any x- or y-intercepts, and draw any asymptotes with dashed lines. Give the equation of any asymptotes of $f(x)$.



Equation of asymptote(s)?

13. [1 points] Solve the equation $4 + e^{3x} = 10$ for x. Give an exact answer.

14. [2 points] Sketch the graph of $f(x) = \ln(x-3)$. Label any x- or y-intercepts, and draw any asymptotes with dashed lines. Give the equation of any asymptotes of $f(x)$.

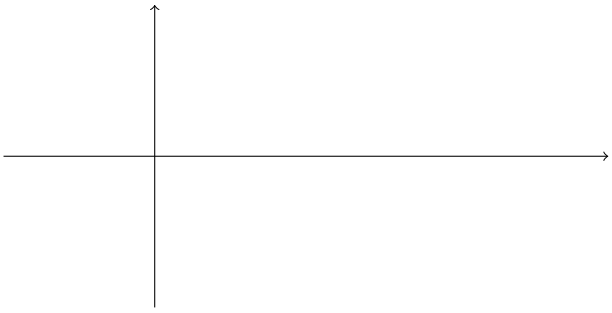


Equation of asymptote(s)?

15. [1 points] Solve the equation $\frac{\ln(x+1)}{5} = 3$ for x. Give an exact answer.

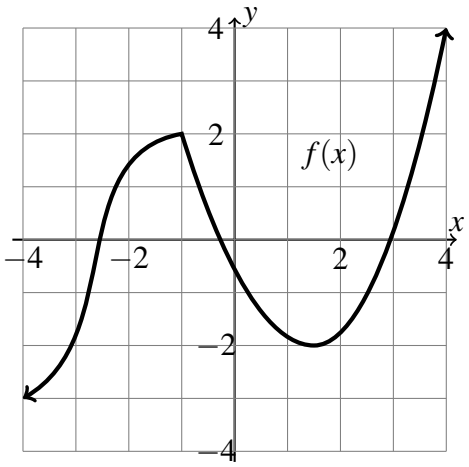
16. [1 points] Solve the inequality $x^2 \geq 4$.

17. [2 points] Sketch the graph of $f(x) = 3\cos(x)$ on the interval $0 \leq x \leq 2\pi$. Label any x- or y-intercepts, and draw any asymptotes with dashed lines. Give the equation of any asymptotes of $f(x)$.



Equation of asymptote(s)? _____

18. [2 points] Use the graph of $f(x)$ below to answer the questions.



a. **Estimate** $f(-2)$. _____

b. **Estimate** an x-value such that $f(x) = 3$.

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