

5. Evaluate.

a) $\log_2 16 =$ _____

b) $\log_{25} 5 =$ _____

6. State the domain of: $f(x) = \log_4(x - 6)$. Circle the correct answer.

a) Domain: $(0, \infty)$

b) Domain: $(4, \infty)$

c) Domain: $(6, \infty)$

d) Domain: $(-2, \infty)$

7. Solve for x . State answer as an ordered pair. Solve algebraically.

$$\begin{cases} 4x - 3y = 18 \\ 2x + 7y = -8 \end{cases}$$

8. Find the quotient and remainder.

$$(x^3 - x^2 + 4) \div (x + 2)$$

Circle the correct answer.

a. $Q(x) = (x^2 + x + 2)$; $R(x) = -8$

b. $Q(x) = (x^2 - 3x + 6)$; $R(x) = -8$

c. $Q(x) = (x^2 - 3x + 6)$; $R(x) = 2$

d. $Q(x) = (3x^2 - 4x + 2)$; $R(x) = 7$

Part II. In this section, partial credit will be awarded for correct work shown. Show all work. Answers without complete work will receive little or no credit. 12 pts. each

9. State the inverse of each.

a) $f(x) = \frac{x+3}{x-2}$

b) $g(x) = x^3 + 8$

$f^{-1}(x) = \underline{\hspace{2cm}}$

$g^{-1}(x) = \underline{\hspace{2cm}}$

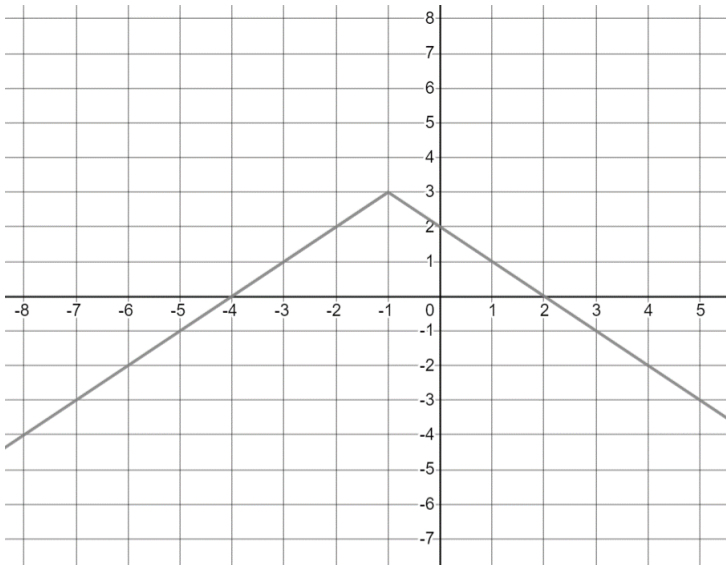
10. Write the equation of the line *in slope-intercept form* ($y=mx+b$) that goes through the points $(-2, 3)$ and $(1, -5)$.

11. Solve for x algebraically and then check your solutions. Show all work and do not just guess and check.

a) $2^3 \cdot 4^x = \frac{1}{8}$

b) $\log_6 x + \log_6 (x-9) = 2$

12. Given the function $f(x) = -|x + 1| + 3$ and its graph below, answer the following.



State the intervals in interval notation.

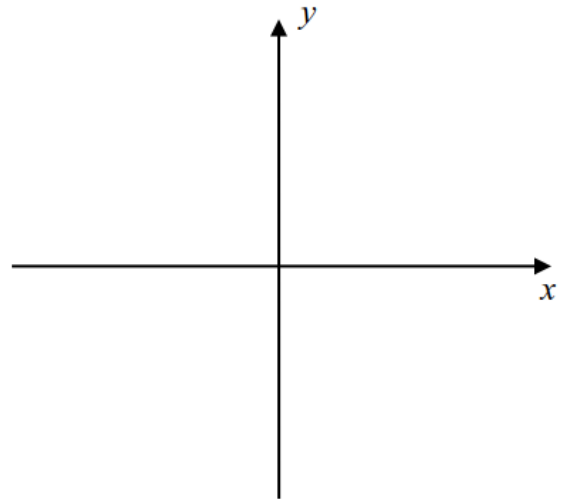
- a) On what interval is $f(x)$ increasing
- b) What is the range?
- c) What are the zeros?
- d) What is $f(0)$?
- e) On what interval is $f(x) < 0$

13. For the function $f(x) = 2x^2 - 6x$, find the following and graph. Be sure to label the vertex and the intercepts.

Concavity: y-intercept:

Zeros:

Vertex:



14. Solve for x algebraically. For part b, state answer in interval notation.

a) Solve: $|4x - 2| + 1 = 6$.

b) $-4 < \frac{-2x}{3} \leq 6$

15. Let $f(x) = x^2 + 2$ and $g(x) = 3x - 2$. Find and simplify the following.

(Parts a and b worth 3 points each and part c worth 6 points.)

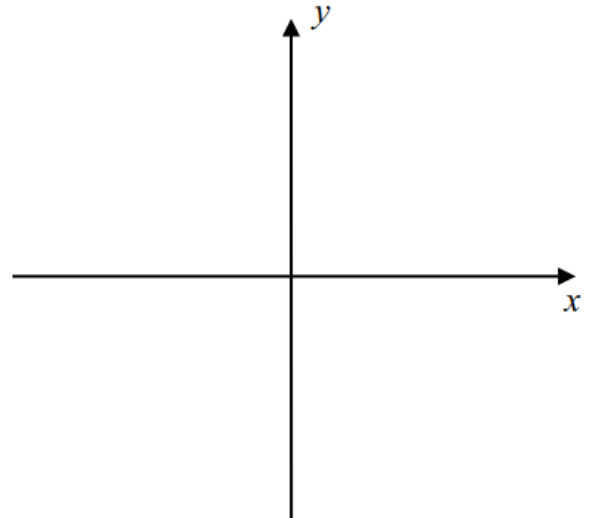
a) $(f - g)(x)$

b) $(f \circ g)(-1)$

c) $\frac{f(x+h) - f(x)}{h}$

16. For the function $f(x) = x^4 - 11x^2 + 18$ find the following and graph. Be sure to label the intercepts.

- y -intercept:
- End Behavior:
- Fully factored form:



Zero	Multiplicity	Tangent or Crosses Thru

17. Solve for x algebraically.

$$\frac{4}{x-3} - \frac{3}{x+3} = \frac{17}{x^2-9}$$

Solution(s): _____.

18. For the function $f(x) = \frac{x+4}{x-2}$, find the following and graph. Plot additional points as needed to have a complete graph. Be sure to label all critical information.

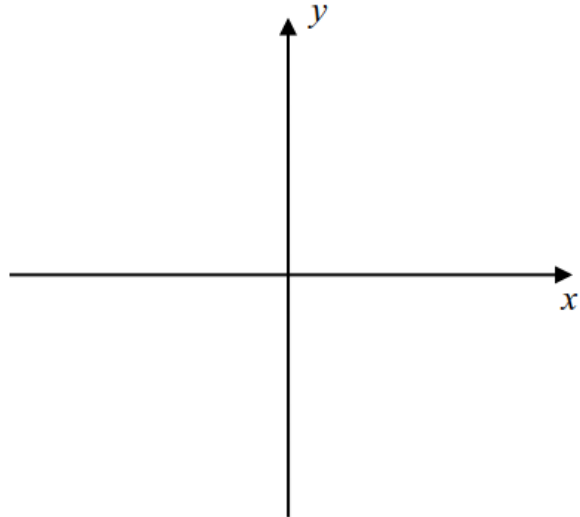
Domain:

Zeros:

y-int:

HA:

VA:



Additional Point(s):

Part III. There are 6 problems in this section. Choose any 4. Indicate in the boxes the problems you want graded. 10 points each.

If you don't mark 4 boxes, the first 4 will be graded.

19. A family wants to enclose a rectangular garden and can only afford to purchase 80 feet of fencing. What is the maximum area the garden can be? You must answer each question below to receive full credit.



Grade

a) Let x be the length of one side of the garden, as shown in the picture on the right. Write a formula for y in terms of x .



$$y = \underline{\hspace{2cm}}$$

b) Express the area of the garden as a function of x .

$$A(x) = \underline{\hspace{2cm}}$$

Don't forget units.

c) What is the value of x which yields maximum area?

d) What is the maximum area the garden can be?



Grade

20. The points $(4,5)$ and $(-2,8)$ are the endpoints of the diameter of a circle. State the center and the radius of the circle. Simplify your answers fully.

a) center: $\underline{\hspace{2cm}}$

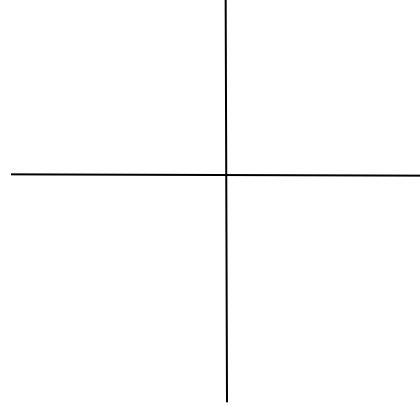
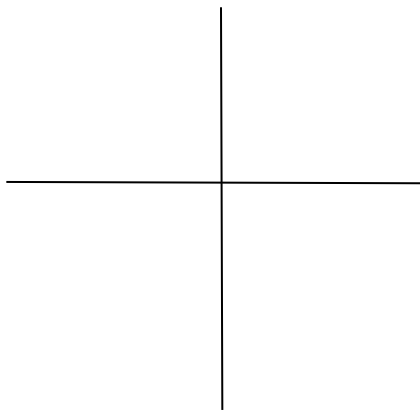
b) radius: $\underline{\hspace{2cm}}$

21. Graph the functions: **Label all intercepts and/or dash in all asymptotes.**

a) $g(x) = \sqrt{3 - x}$

b) $h(x) = 2^x - 1$

Grade



22. Given the polynomial $f(x) = x^3 + x^2 - 2$, find all zeros (real and complex).

Grade

a) List the possible rational zeros

b) Find 1 rational zero

c) Find the other zeros. Simplify your answers fully.

23. Solve $x^3 - x^2 - 6x \geq 0$ algebraically. Show your work! Write answer in interval notation.



Grade

24. Graph the piecewise function. Label your points clearly.



Grade

Note: Endpoints should be marked as open $\rightarrow \circ$ or closed $\rightarrow \bullet$

$$f(x) = \begin{cases} -2, & \text{for } x < -1 \\ 3x + 4, & \text{for } x \geq -1 \end{cases}$$

