

Name: _____

Always label axes of graphs with numbers and letters.

1. For the function $f(x) = x^2 - 7x + 5$ evaluate and simplify

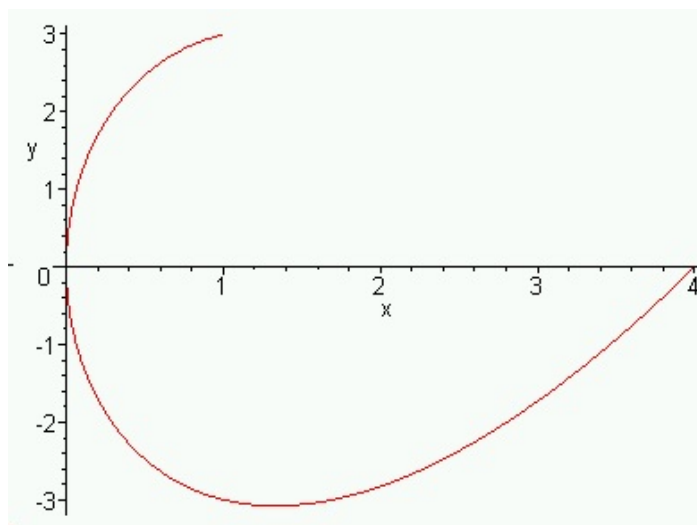
a. $f(4)$

b. $f(x+h)$

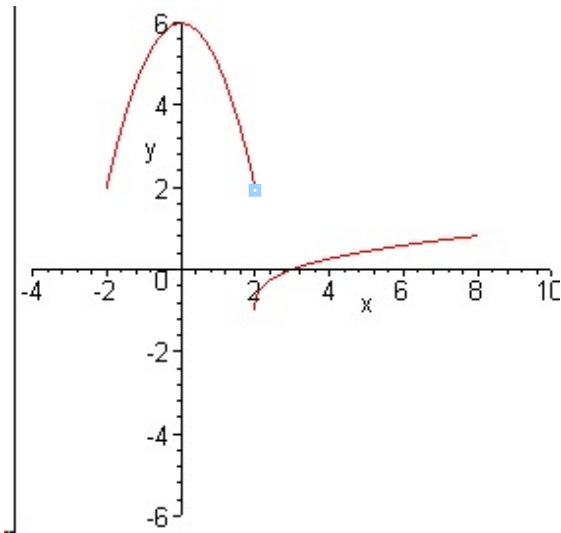
c.
$$\frac{f(x+h) - f(x)}{h}$$

2. Find the domain and range for the function $f(x) = 3 - \sqrt{x+4}$.

3. Is this graph the graph of a function? Why or why not?



4. Given this graph of a piecewise defined function, g , do the following.



- find $g(0)$
- find $g(2)$
- find the domain and range.
- give intervals where the function is increasing and where it is decreasing.

5. For this piecewise defined function

$$g(x) = \begin{cases} 3 - x & x < 2 \\ 4 & x = 2 \\ x^2 - 6 & x > 2 \end{cases}$$

- Sketch the graph;
- give the domain and range;
- give intervals where the function is increasing and decreasing.
- find $g(1)$, $g(2)$ and $g(3)$.

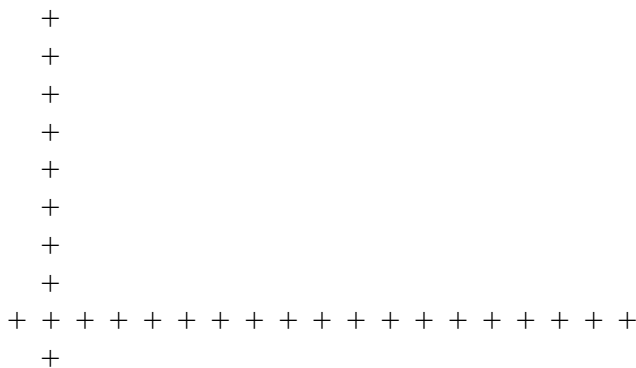
5. You wish to have a cup of tea. You get water from the cold water tap, heat it in the microwave until it boils, put a tea bag in it, let it steep for a couple of minutes, let it cool a couple of minutes more, then drink it. Sketch a graph of the temperature T of the liquid as a function of time t . Label the axes with some appropriate numbers and letters.



6. Consider this table of values of pressure and volume of an enclosed gas at a fixed temperature.

Pressure	30	60	90	120	150	180
Volume	120	60	40	30	24	20

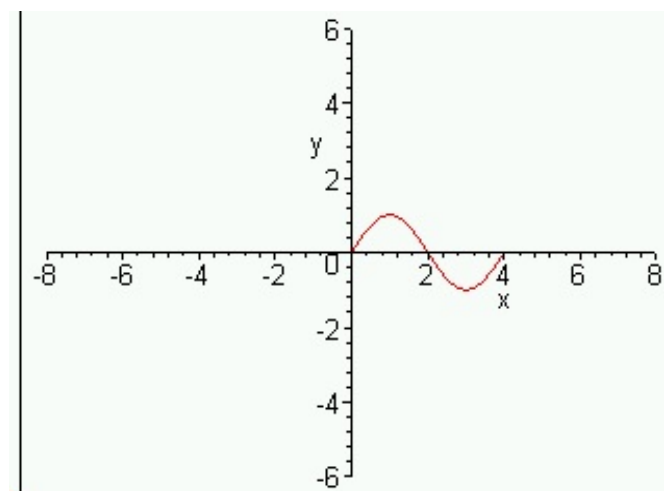
- a. Sketch a graph of volume V as a function of pressure P .
- b. From the graph, estimate the values of $V(50)$ and $V(20)$.



7. The velocity of a certain falling object is given by $v = 96 - 32t$ and its position is given by $s = 200 + 96t - 16t^2$. find a formula for the position s as a function of the velocity v .

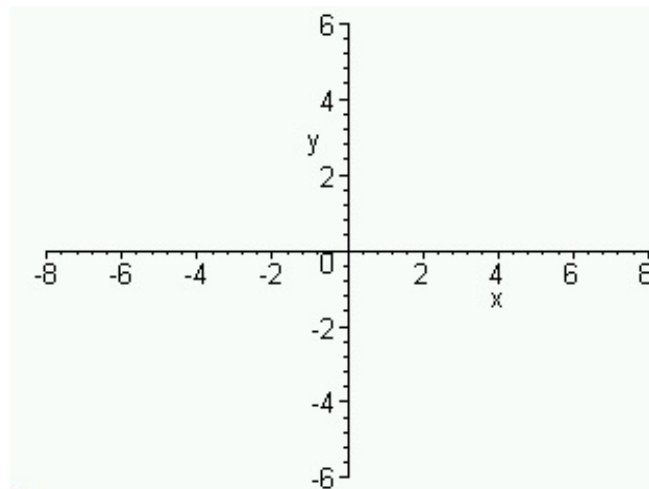
8. In electricity the force F exerted by two charged particles on each other is directly proportional to the product of the two charges, q_1 and q_2 , and varies inversely as the square of the distance d between the particles.
- Find a formula for F in terms of q_1 , q_2 , and d and a proportionality constant k .
 - For two certain particles, $q_1 = 0.4$, $q_2 = 0.3$ and $d = 6$ and the force was 5. Find the proportionality constant k and rewrite the formula for F .
 - What is the force if the distance is tripled.
9. Determine whether $f(x) = 3x^3 - 2x^{-1} + 5$ is an even function, odd function or neither, and tell why.

10. Given the graph of $y = f(x)$ below, sketch the graphs of the other functions given in standard form.



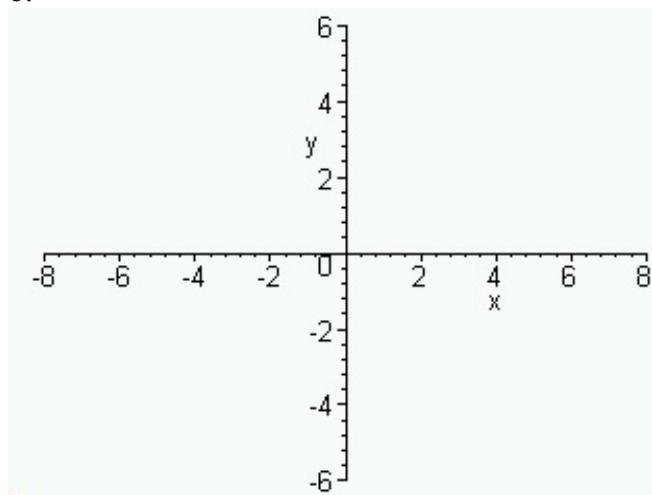
$$y = f(x)$$

a.



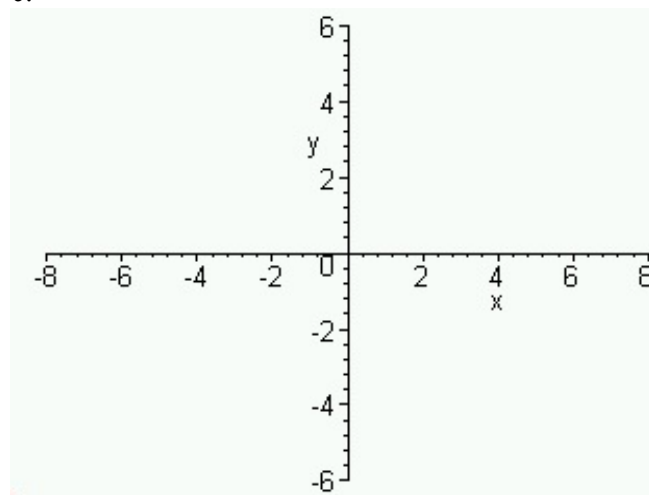
$$-y = f(x-2)$$

b.



$$y/3 = f(-x)$$

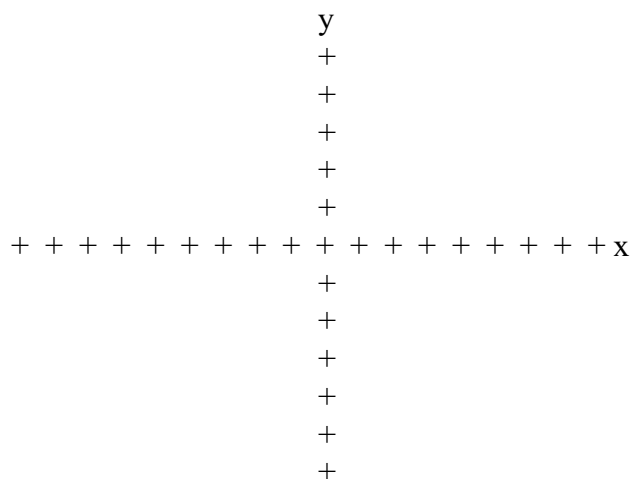
c.



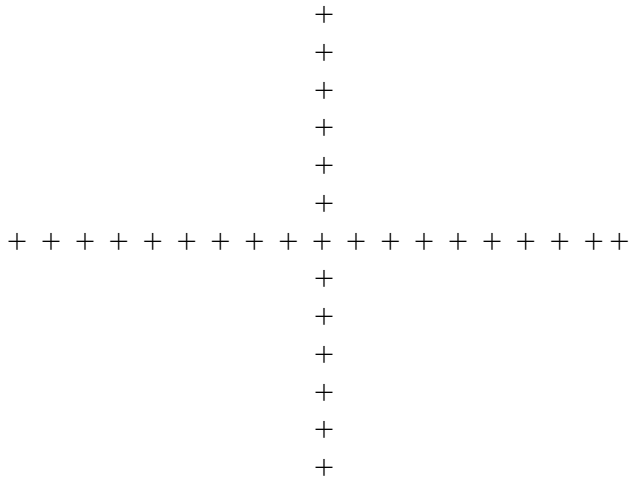
$$y-4 = f(x/2)$$

11. Consider this quadratic function $y = f(x) = 3x^2 - 12x + 9$.

- complete the square to put the equation into standard form;
- from the standard form, give the shape (factors) and vertex;
- graph the parabola;
- give its maximum or minimum point;
- find its x- and y-intercepts.



12. The price p (in dollars) for a certain type of cosmetic is given by $p = 160 - x$, where x is the number of units (in cases) demanded. The Revenue R (in dollars) is given by $R = p \cdot x$.
- Find the equation for the Revenue R in terms of x .
 - Find the vertex and graph R in terms of x .
 - From the graph and its vertex, give the number of units that will produce maximum revenue.
 - Give the maximum revenue.
 - Give the price that will produce maximum revenue.
 - Give the number of units that will produce no revenue.



13. For the functions $f(x) = \sqrt{x+1}$ and $g(x) = \frac{x+3}{x-4}$,

a. Find the product $(f \cdot g)(x)$

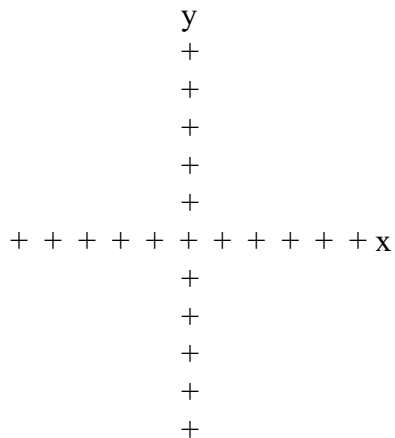
b. Find the domain of $(f \cdot g)$

c. Find $f(g(5))$

d. Find the composite function $f(g(x))$

e. Find the composite function $g(f(x))$

f. Sketch a graph of $y = f(g(x))$ using a window $-8 \leq x \leq 8$, $-8 \leq y \leq 8$. Label the axes with numbers



14. Determine whether the function $f(x) = x^2 - 8x$ is one-to-one on the interval $[1,5]$. Sketch a graph to support your answer.

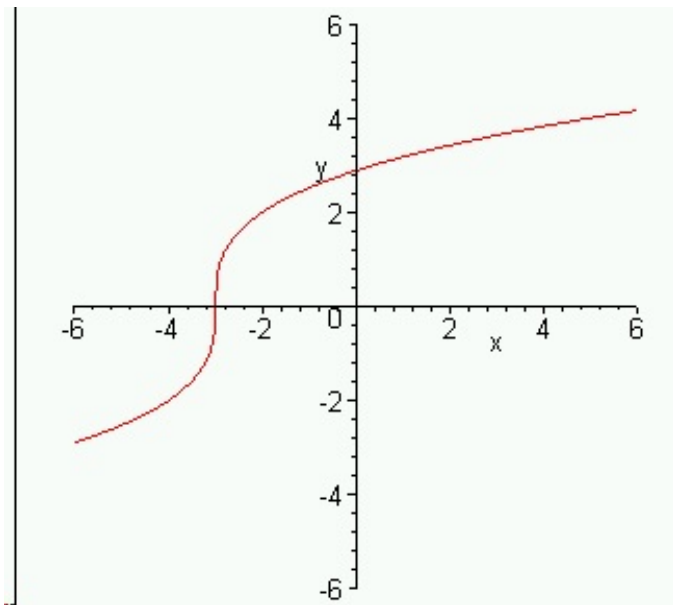
15. For the function $f(x) = \frac{x+2}{x-5}$ find $f^{-1}(x)$

16. Show that the f and f^{-1} above are inverses of each other by simplifying $f(f^{-1}(x))$ and $f^{-1}(f(x))$

17. Decompose this composite function into two functions of which it is the composition.

$$f(g(x)) = \frac{(x-4)^2 + 3}{x-4}$$

18. Graph the inverse of the function below.



19. Find the average rate of change for the function $f(x) = x^2 - 3x + 5$ between $x = 1$ and $x = 4$.