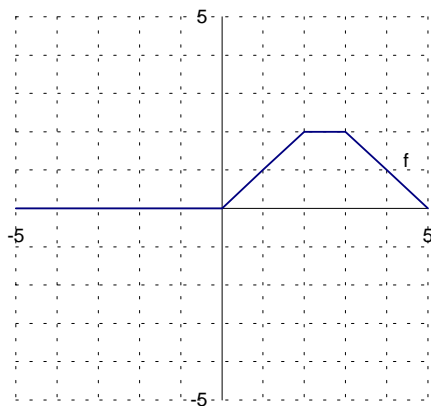


7. Consider the function $f(x) = |x + 2| + |x - 4|$.
- Create a piecewise definition for the function f .
 - Use the piecewise definition found in part (a) to help sketch the graph of f . Place your plot on graph paper. Label and scale each axis. *Note: Little credit will be given for this part if you have to use your calculator to draw the sketch.*
8. Find the equation of the lines passing through the point $(2, -3)$, one of which is
- parallel to the line passing through the points $(1, -2)$ and $(-2, -3)$, the other
 - perpendicular to the line $2x + 3y = 6$.
9. The cost of a tomato varies directly as its weight (some would say the cost is *proportional* to its weight). If a 0.45 pound tomato costs \$0.75,
- express the cost C of the tomato as a function of its weight W , and
 - use the result of part (a) to find the cost of a tomato weighing 0.56 pounds.
10. Suppose the force felt by a sky-diver due to wind resistance varies directly as the square of her velocity. If a sky-diver traveling at 50 mi/h feels a resistance of 60 pounds, express the resistance R as a function of the velocity v .
11. Suppose that the value of a copying machine is a linear function of the amount of time since it was first purchased. If the purchase price was \$50,000, and the value after 5 years is \$20,000,
- express the value V of the copier as a function of t , the number of years that have passed since its purchase, and
 - use the result of part (a) to predict the value of the copier 7 years after its purchase.
12. Masses are hung on a spring and the distance the spring stretches from its unstretched position is measured.
- | | | | | | | |
|-------------------------|-----|-----|-----|-----|-----|-----|
| Mass (g) | 50 | 100 | 150 | 200 | 250 | 300 |
| Distance stretched (cm) | 1.2 | 1.9 | 3.1 | 4.0 | 4.8 | 6.2 |
- Plot the data on a sheet of graph paper. Label and scale each axis. You may use different scales on each axis, if you wish.
 - Using a ruler, draw what you feel to be the “line of best fit” on the plot from part (a).
 - Use the plot from part (c) to predict the distance the spring will stretch if a mass of 175 g is attached to the spring.
 - Use your calculator’s linear regression capabilities to find the equation of the line of best fit. Record this result on your plot.
 - Use your calculator to accurately predict the distance the spring will stretch if a mass of 175 g is attached to the spring.
13. Given the points $A(2, -3)$ and $B(-6, 5)$, find
- the distance between the points A and B, and
 - the midpoint of the line segment joining A and B, and
 - the point that is $7/8$ of the way from the point A to the point B, and
 - the equation of the circle with center at A and passing through the point B.
14. State the analytic test for symmetry with respect to the x -axis and use the test to show that $2x + 4y^2 = 9$ is symmetric with respect to the x -axis.
15. State the analytic test for symmetry with respect to the y -axis and use the test to show that $4y - x^2 = 3$ is symmetric with respect to the y -axis.
16. State the analytic test for symmetry with respect to the origin and use the test to show that $x^2 + 4y^2 = 9$ is symmetric with respect to the origin.

17. Complete the definition: The function f is an **even** function if and only if Use your definition to show that $f(x) = x^4 + 8x^2 - 16$ is an even function.
18. Complete the definition: The function f is an **odd** function if and only if Use your definition to show that $f(x) = x^5 - 2x^3$ is an even function.
19. Consider the following plot of the function f .



- a) Sketch the graph of $y = f(x + 2)$.
- b) Sketch the graph of $y = -f(x) + 2$.
- c) Sketch the graph of $y = f(2 - x)$.
- d) Sketch the graph of $y = f(2x)$.
- e) Sketch the graph of $y = 2f(x - 1) + 3$.
20. Consider the functions

$$f(x) = \frac{x + 1}{x - 1} \quad \text{and} \quad g(x) = \frac{2x}{x + 3}$$

and simplify

- a) $(f + g)(x)$, and
- b) $(f \circ g)$, and
- c) $(g \circ f)(x)$.
21. Find two function f and g so that $(f \circ g)(x) = \sqrt{2x + 3}$.