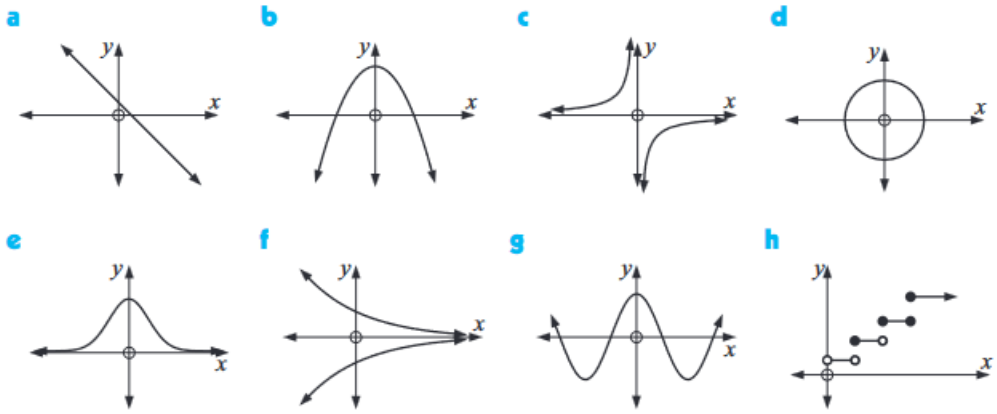
ALGEBRA 2
UNIT 1 REVIEW

EXAM DATE: SEPTEMBER 14, 2023

Question 1. For each of the following, determine whether or not the graph is a function.



Question 2. For each of the following equations, determine whether or not it is an `Always True`, `Sometimes True`, or `Never True` statement. If it is `Sometimes True`, determine when it is `True`.

(a) $3x + 7x = 10$

(b) $3x + 7x = 10x$

(c) $9 - 4x + 4 = -5x - x + 2$

(d) $-7(2 + 4x)/14 = -1 + 2x$

(e) $2(4 - x) + 2x = 16 - 3x - 8$

(f) $x(2 + x) = 3(2 + x)$

(g) $|x| = -3$

(h) $|x| = 3$

(i) $|x| = x$

(j) $(x-3)^2 + (x+1)^2 = (x-2)^2 + (x+3)^2$

(k) $2(t+1) = 5(t-2)$

(l) $(2x+3)^2 = 4x^2 + 12x + 9$

Question 3. For each of the following functions, compute their output:

(a) $f(x, y, z) = 3x^y - z$, compute $f(2, 3, -5)$

(b) $g(x, y, z) = 4$, compute $g(1, 2, 3)$

(c) $h(x) = x^2 - 2$, compute $h(2)$

(d) $j(x, y) = \sqrt{x^2 - y^2}$, compute $j(5, 4)$

(e) $k(a, b) = a + \dfrac{|b-1|}{2}$, compute $k(\frac{1}{2}, 2023)$

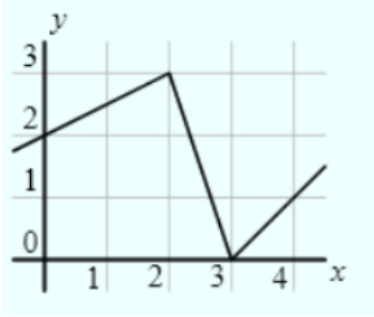
Question 4. Solve for all x that satisfy the inequalities and plot your answer on a number line:

(a) $|x| \geq 3$

(b) $|x| < 3$

(c) $|x+4| \geq x + 4$

Question 5. Consider the graph of $f(x)$ below.



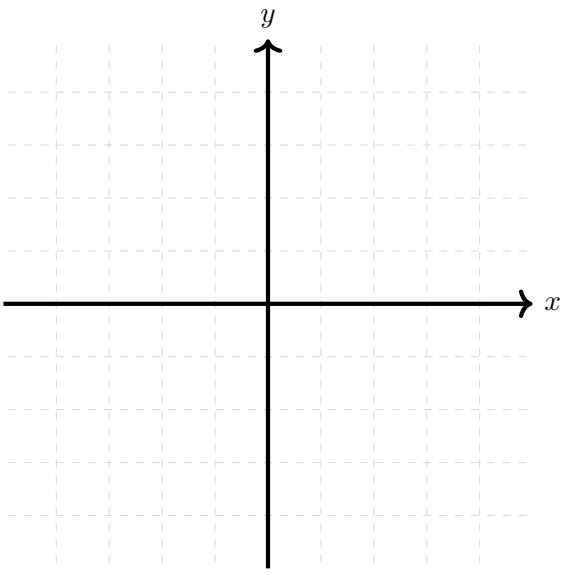
(a) Is the graph of $f(x)$ a function?

(b) What is $f(2)$?

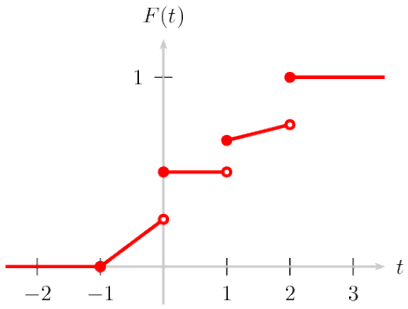
(c) What is x if $f(x) = 2$?

Question 6. Draw a graph of the function

$$f(x) = \begin{cases} 0 & \text{if } x > 3 \\ 3 & \text{if } -2 \leq x < 0 \\ 2 & \text{else} \end{cases}$$



Question 7. Consider the graph of the function $F(t)$ below:



(a) What is the value of $F(1)$?

(b) What is the value of $F(0)$?

(c) What is the value of $F(2)$?

(d) What is the value of $F(-1)$?

Question 8. Expand each of the following:

(a) $(x+5)(x-3)$

(b) $(x+11)(x-1)$

(c) $(x+\frac{1}{2})(x-\frac{1}{2})$

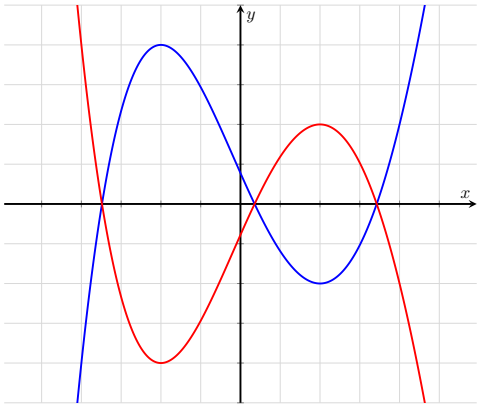
(d) $(x+\frac{3}{4})(x+\frac{1}{4})$

(e) $(x+2)(x-15)$

(f) $(2x+1)(2x-1)$

(g) $(x+y+z)(z-y-x)$

Question 9. Consider the following function which is drawn below:



Shade in the region where $0 < x < 5$ and $f(x) \leq y \leq g(x)$.

The function f is the blue curve and g is the red curve.