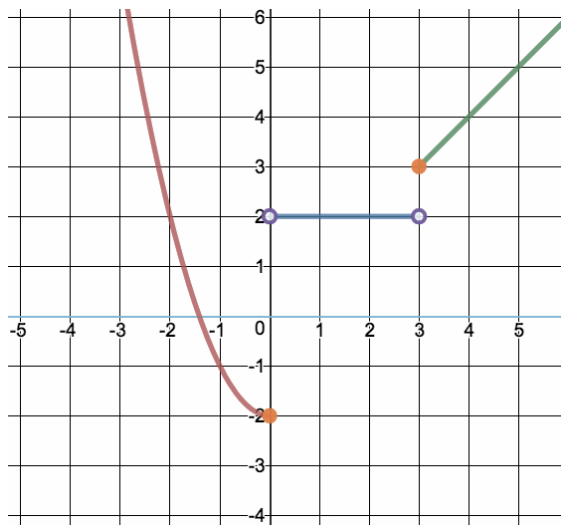


PC 1-6 Investigation and Notes (Piecewise functions)

A **piecewise function** is a function that is graphed in pieces. Each piece is defined for specific x-values. Below is an example of a piecewise function.

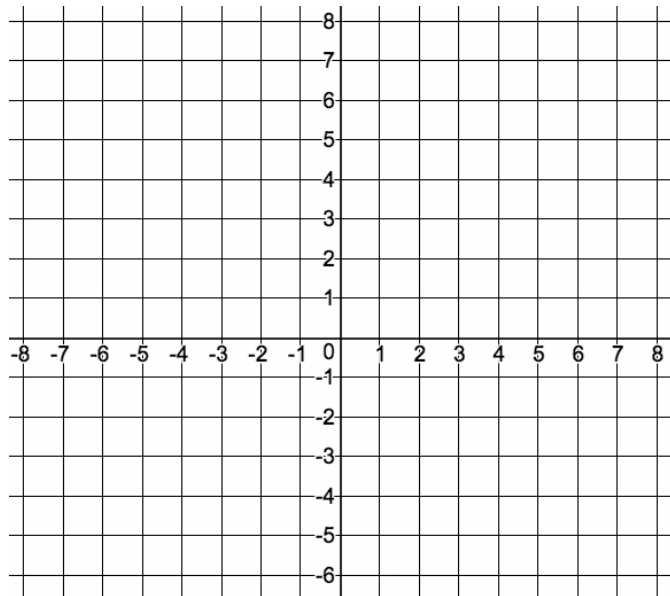
$$f(x) = \begin{cases} x^2 - 2 & \text{if } x \leq 0 \\ 2 & \text{if } 0 < x < 3 \\ x & \text{if } 3 \leq x < \infty \end{cases}$$

The graph of $f(x)$:

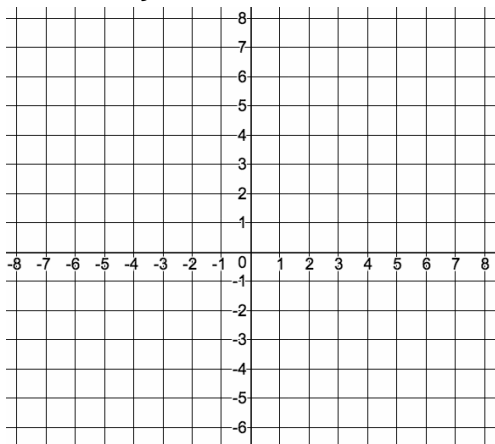


Graph the piecewise function $g(x)$.

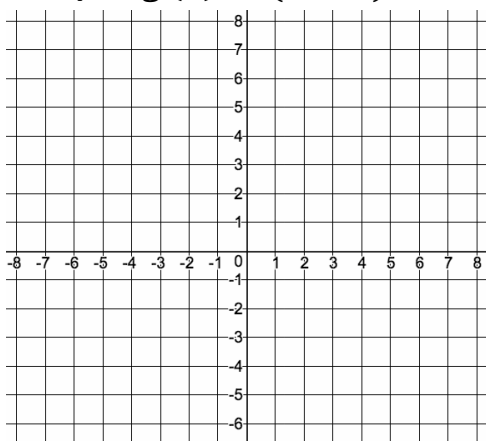
$$g(x) = \begin{cases} (x + 3)^2 + 2 & \text{if } x < -1 \\ 4 & \text{if } -1 \leq x < 2 \\ -\frac{1}{2}x & \text{if } 2 \leq x < \infty \end{cases}$$



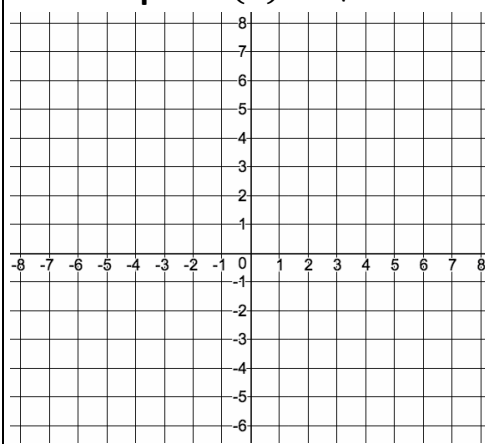
Graph. $f(x) = 2x - 3$



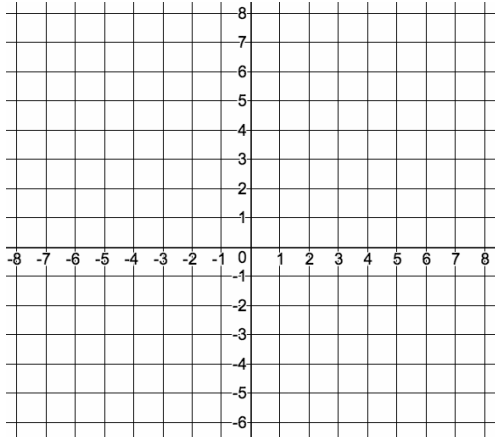
Graph. $g(x) = (x + 4)^2 - 2$



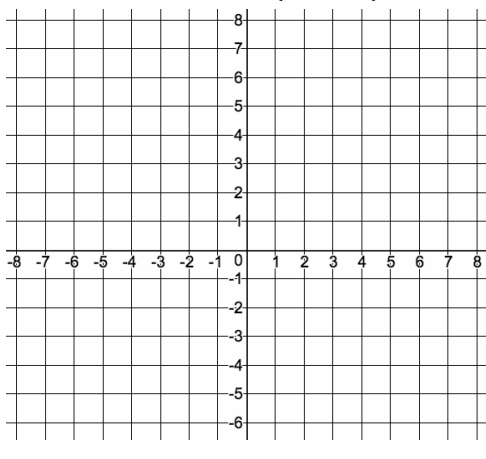
Graph. $h(x) = \sqrt{x + 5}$



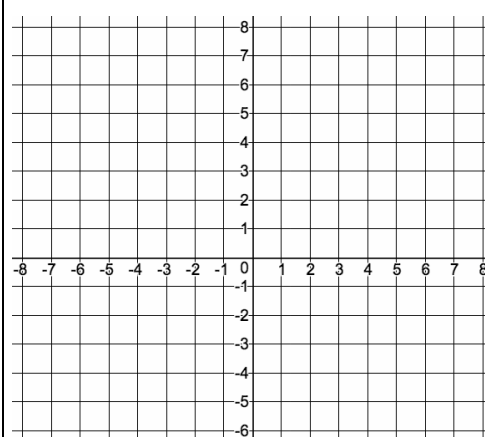
Graph. $m(x) = -\frac{2}{3}x + 3$



Graph. $n(x) = (x - 4)^2 - 2$



Graph. $l(x) = \frac{1}{x-4} + 2$



Problem 1 appears in your textbook as problem #50 on page 87.

- 1) In February 2013, Laclede Gas had the following rate schedule for natural gas usage in single family residences:

Monthly Customer Charge : \$19.50

Distribution Charges:

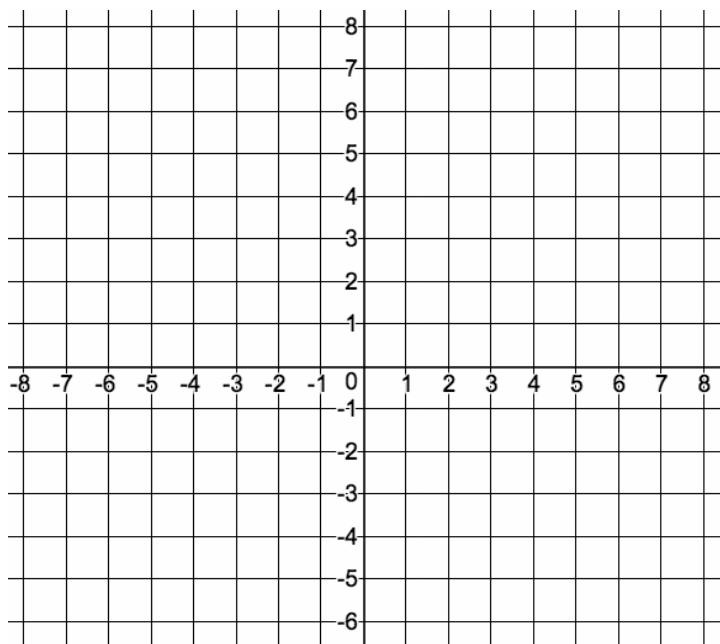
- **First 30 therms: \$0.65403/therm**
- **Over 30 therms: \$0.04235/therm**

Gas Supply Charge \$0.53668/therm

- a) What is the charge for using 20 therms in a month?
- b) What is the charge for using 150 therms in a month?
- c) Develop a model that gives the monthly charge C for x terms of gas.
- d) Graph the function found in part (c).

- 2) Graph the piecewise function below.

$$g(x) = \begin{cases} (x + 2)^2 + 4 & \text{if } x < -2 \\ -3 & \text{if } -2 \leq x < 1 \\ -x + 2 & \text{if } x \geq 1 \end{cases}$$



- 3) Write the equation of the piecewise function $h(x)$ graphed below.

