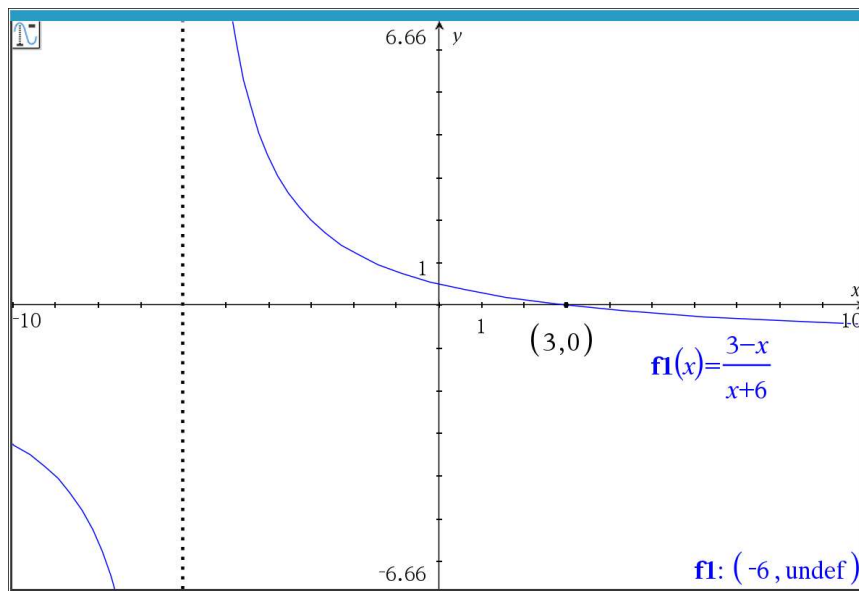


Find the domain of $f(x)$.

$$(-\infty, \infty) = \{x \mid x \in \mathbb{R}\} = \{x \mid -\infty < x < \infty\}$$

$$\text{Let } g(x) = \frac{3-x}{x+6}$$

$$\begin{aligned} \text{domain of } g &= \{x \mid x \neq -6\} \\ &\text{to avoid division by } 0 \\ &= (-\infty, -6) \cup (6, \infty) \end{aligned}$$



The graph confirms our domain.

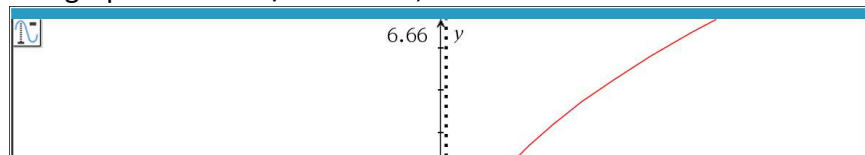
$$\text{Let } h(x) = \sqrt{7x-1}$$

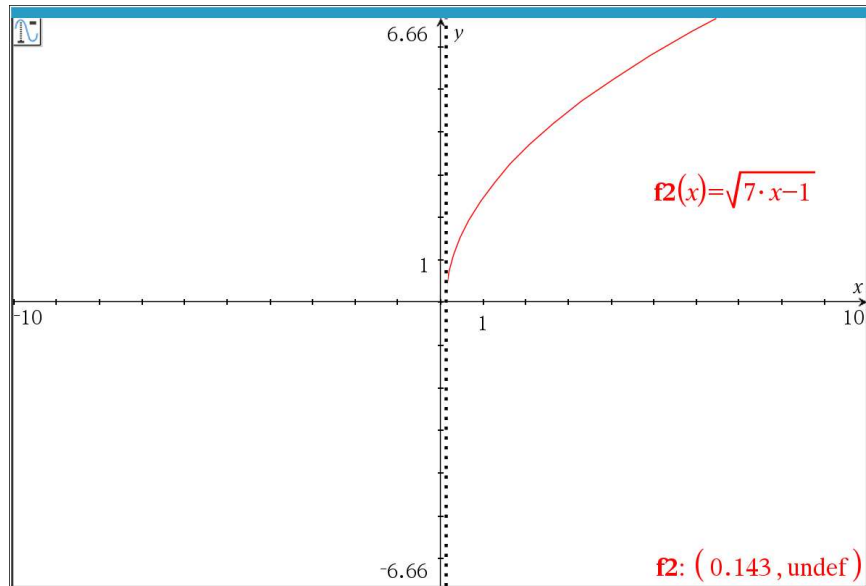
$$7x-1 \geq 0 \Rightarrow 7x \geq 1 \Rightarrow \boxed{x \geq \frac{1}{7}}$$

$$\begin{aligned} \text{domain of } h &= \{x \mid x \geq \frac{1}{7}\} \\ &= \left[\frac{1}{7}, \infty\right) \end{aligned}$$

$$1/7 = 0.1429$$

The graph rounded $1/7$ to 0.143 , which is too small.





Example 1.4.4. The height h in feet of a model rocket above the ground t seconds after lift-off is given by

$$h(t) = \begin{cases} -5t^2 + 100t, & \text{if } 0 \leq t \leq 20 \\ 0, & \text{if } t > 20 \end{cases}$$

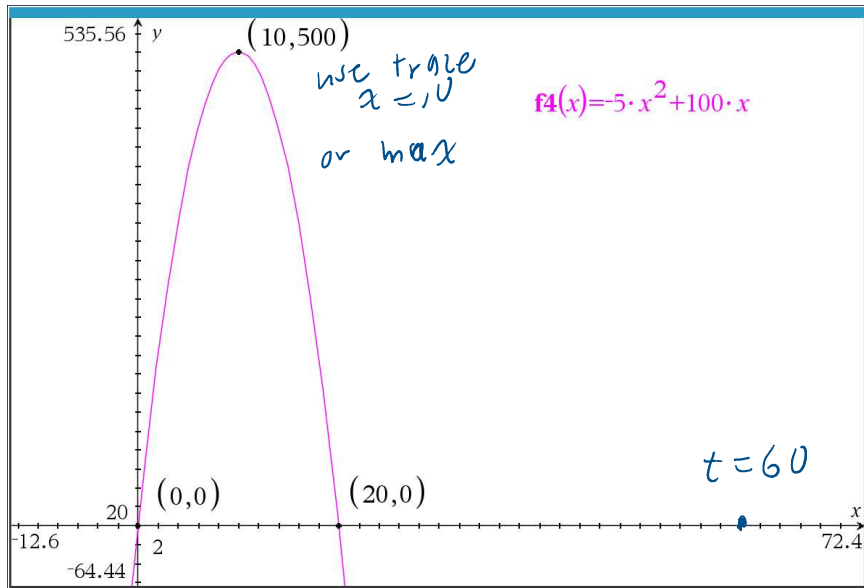
1. Find and interpret $h(10)$ and $h(60)$.
2. Solve $h(t) = 375$ and interpret your answers.

$$\begin{aligned} h(10) &= -5(10^2) + 100(10) \\ &= -5(100) + 1000 \\ &= -500 + 1000 \\ &= \boxed{500} \end{aligned}$$

Interpretation: The rocket is 500 feet above the ground 10 seconds after lift-off.

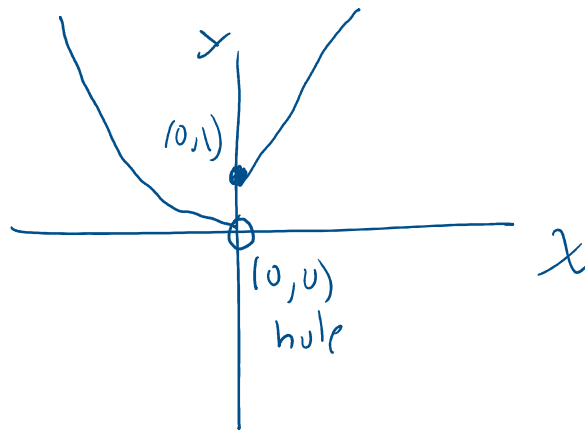
$$h(60) = 0$$

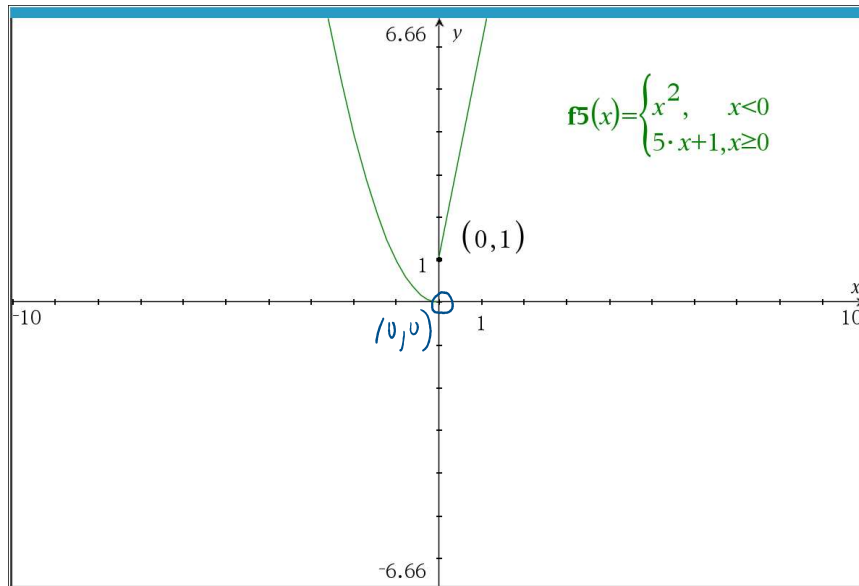
Interpretation: The rocket is on the ground 60 seconds after lift-off.



Piecewise defined function

$$f(x) = \begin{cases} x^2 & \text{for } x < 0 \\ 5x + 1 & \text{for } x \geq 0 \end{cases}$$





$$f_1 = (x^2)(x < 0) + (5x + 1)(x \geq 0)$$

$$x < 0 \quad (x^2)(1) + (5x + 1)(0)$$

$$x \geq 0 \quad (x^2)(0) + (5x + 1)(1)$$

Your name MTH 161-006N quiz 2 no calculator.

1.4.2 EXERCISES

In Exercises 1 - 10, find an expression for $f(x)$ and state its domain.

1.

- f is a function that takes a real number x and performs the following three steps in the order given: (1) multiply by 2; (2) add 3; (3) divide by 4.

$$f(x) = \frac{2x + 3}{4} \quad \text{domain } (-\infty, \infty)$$

2.

In Exercises 11 - 18, use the given function f to find and simplify the following:

- $f(3) = \frac{3}{3-1} = \frac{3}{2}$
- $f(4x) = \frac{4x}{4x-1}$
- $f(x-4) = \frac{x-4}{x-4-1} = \frac{x-4}{x-5}$

$$\begin{aligned} &= \frac{x-4}{x-4-1} = \frac{x-4}{x-5} \\ 15. f(x) &= \frac{x}{x-1} \end{aligned}$$