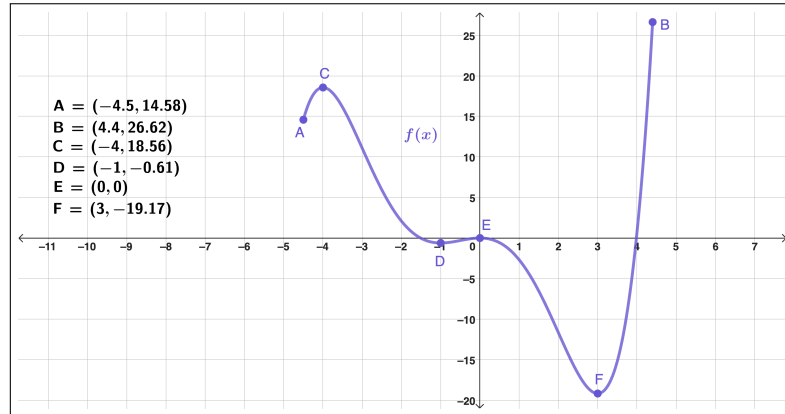


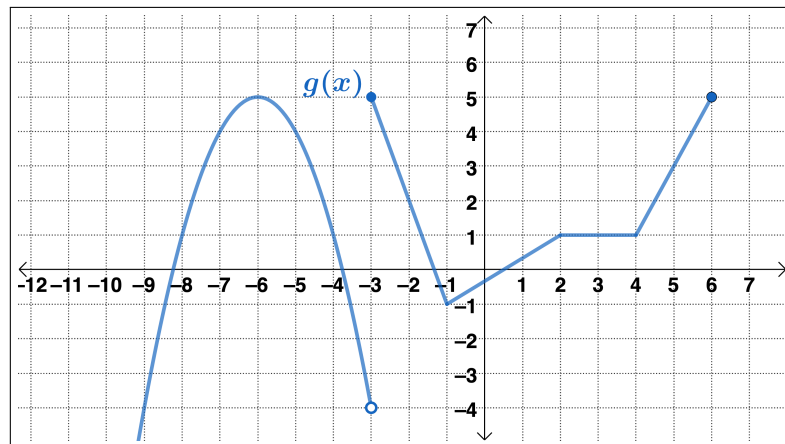


SESSION 8: SECTIONS 3-4 AND 3-5

1. For the graph of  $f(x)$  shown below with domain  $[-4.5, 4.4]$  find (a) any local extrema and (b) any absolute extrema, as well as where they occur, of  $f(x)$ . Specify whether an extremum is a minimum or maximum.



2. Use the graph of  $g$  below to find the absolute extrema of  $g$  on each of the given intervals, if they exist.



- (a)  $[-4, 2]$
- (b)  $(-2, 6]$
- (c)  $(-2, 6)$
- (d)  $[-9, 6)$
- (e)  $(-9, 6]$

3. Find the absolute maximum and minimum of  $f(x) = x^3 + \frac{3}{2}x^2 - 18x$  on each of the given intervals.

(a)  $[-5, 5]$

(b)  $[-6, 4]$

(c)  $[-4, 0]$

4. Determine the absolute extrema of  $g(x) = e^{(x-2)^2}$  on  $(1, 3)$ .

5. Draw a graph of a function on the interval  $(-2, 4]$  that has an absolute maximum at  $x = 4$ , a local maximum at  $x = 0$ , a local minimum at  $x = 2$ , and no absolute minimum.

6. Find two positive numbers such that the sum of the one and the square of the other is 200 and whose product is a maximum.

7. Mike has a 450 square foot area that he intends to use to build a rectangular enclosure for his Scottish terrier (a dog). He plans to build the enclosure against one side of his house, so fencing is needed on just three sides of the enclosure. Determine the dimensions that will minimize the amount of feet of fencing Mike can purchase to enclose the area as he intends.

8. You have a piece of cardboard that is 30 cm by 16 cm and you want to cut out the corners and fold up the sides to form a box. Determine the height of the box that will give a maximum volume.

9. A closed box is made with a square base and must have a volume of 343 cubic inches. The material for the sides and the top cost \$0.02 per square inch, and the material for the base costs \$0.04 per square inch. Determine the dimensions of the box that minimize the cost of the materials. Round to two decimals if necessary,