BECA / IB Math 03-Quadratic functions Name:
28 January 2022

4.5 Classwork: Cubic function applications

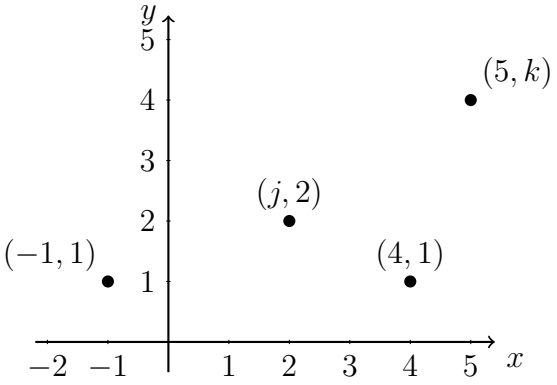
1. Do Now: A function composed of four points $\{(-1,1),(j,2),(4,1),(5,k)\}$ is plotted on the below.

   (a) Write down j

   (b) Write down k

   (c) Write down the domain.

   (d) Add an ordered pair to the relation so that it would *not* be a function.



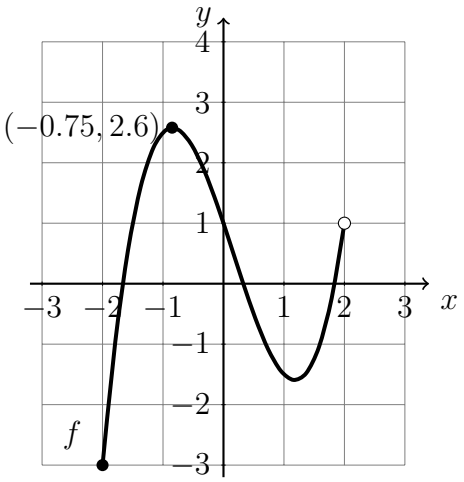
2. The graph of a function f is shown on the grid below.

   (a) Write down $f(-2)$

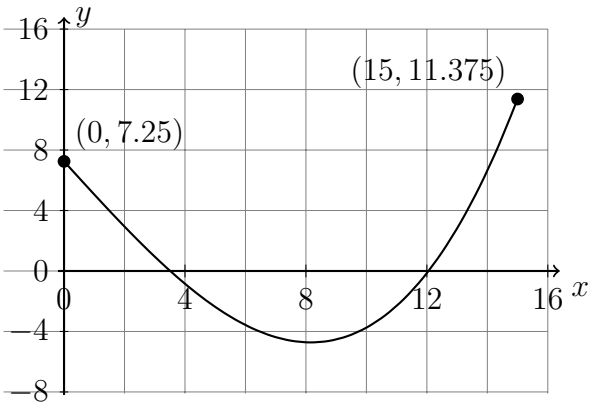
   (b) Find x for $f(x) = 1$.

   (c) Write down the domain.

   (d) Write down the range.



3. The ramp in a skateboard park is modeled by the cubic function $h(x) = 7.25 - 2.2x + 0.011x^3$ where h is the height in feet above ground and x is the horizontal distance (ft).

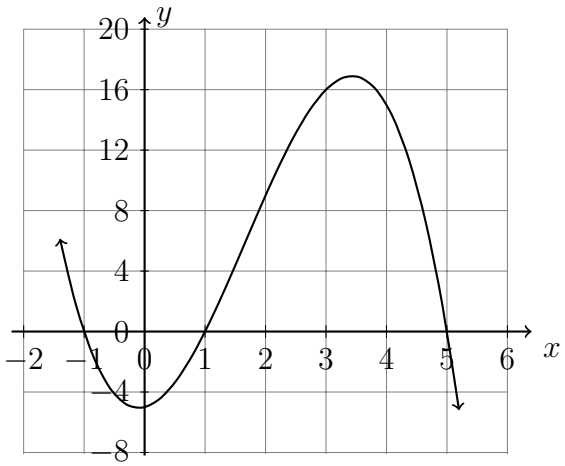


   (a) How wide is the ramp in feet?

   (b) Which lip is higher, the right or left lip? By how much?

   (c) What is the maximum depth below ground of the ramp?

4. A cardboard box manufacturing company is building boxes with length represented by $x + 1$, width by $5 - x$, and height by $x - 1$. The volume of the box is modeled by the function below.



(a) Over what interval of positive x values is the volume positive?

(b) Estimate the maximum possible volume of the box.

(c) Find the value of x would maximize the volume of the box.

5. Shown in the plot below is the function $f(x) = x^3 + 4x^2 - 1x - 4$.

(a) Write down the value of $f(0)$. On the graph, mark the point for $f(0)$ with a star.

(b) Write down the solutions to $f(x) = 0$. Mark them with "X" marks on the graph.

(c) Mark the portion of the function that is *decreasing* with a squiggly line.