

4.9 PreQuiz: Polynomial and rational functions

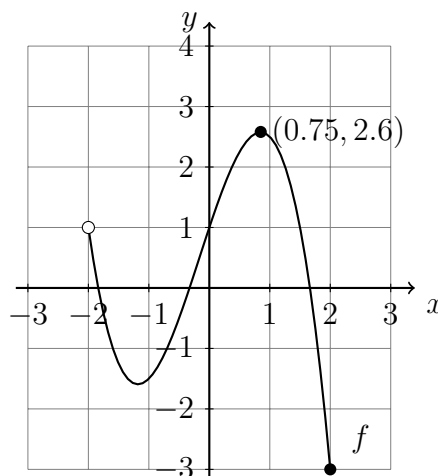
1. The graph of a function f is shown on the grid below.

(a) Write down $f(0)$

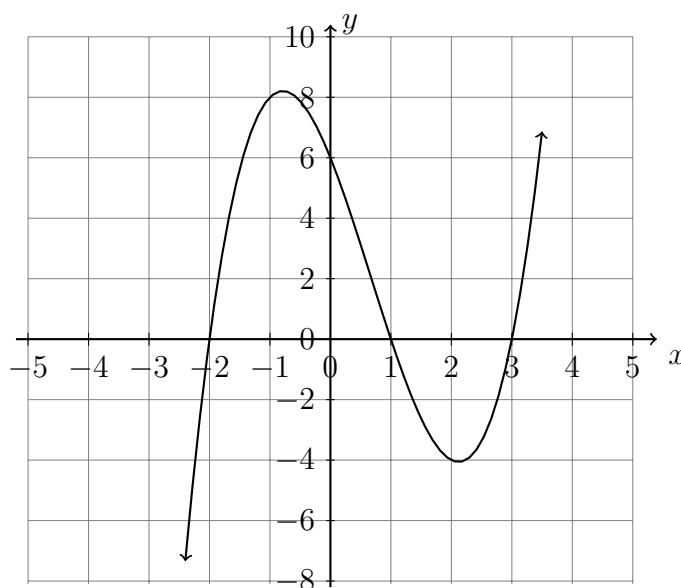
(b) Find x for $f(x) = -3$.

(c) Write down the domain.

(d) Write down the range.



2. Part of the function $f(x) = x^3 - 2x^2 - 5x + 6$ is shown on the graph.



(a) Write down the y -intercept.

(b) Write down the x -intercepts.

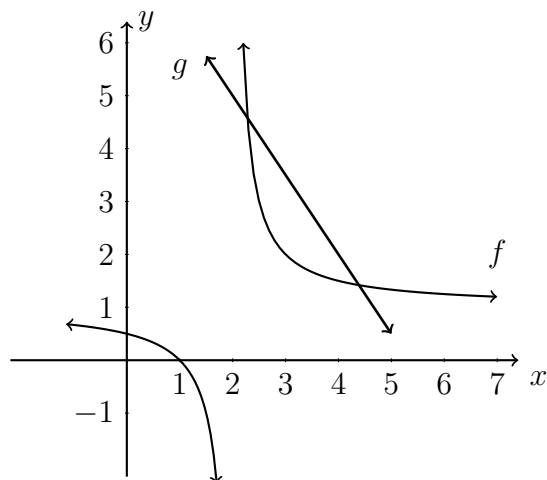
(c) Label the local maximum and local minimum as ordered pairs.

(d) Show that 1 is an x -intercept because $x = 1$ is a solution to $f(x) = 0$.

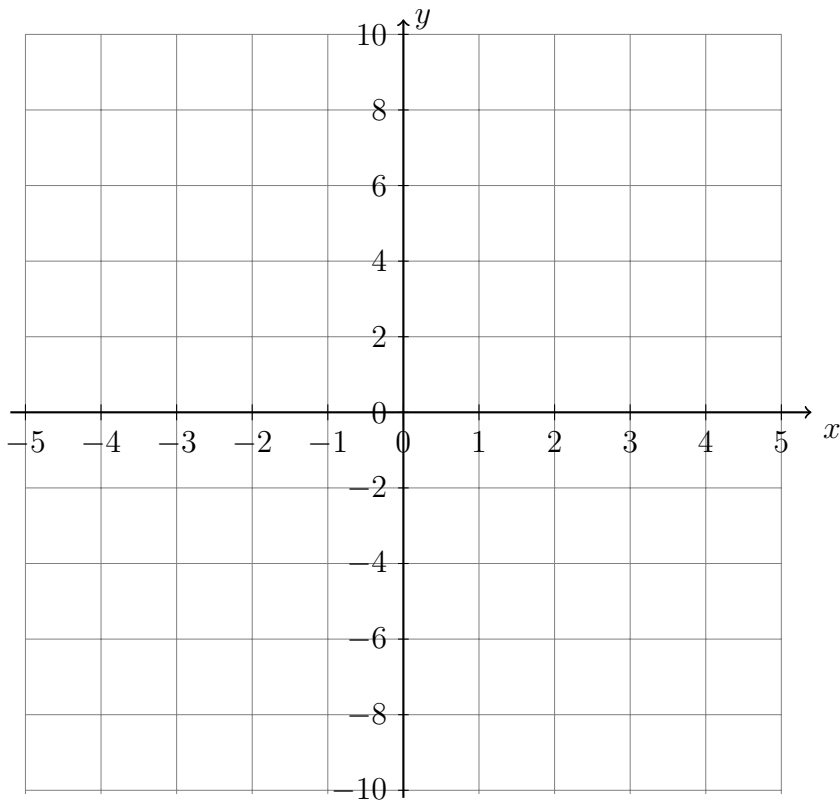
3. The rational function $f(x) = \frac{1}{x-2} + 1$ and the linear function $g(x) = -\frac{3}{2}x + 8$ are graphed below.

(a) Find the solutions to $f(x) = g(x)$.

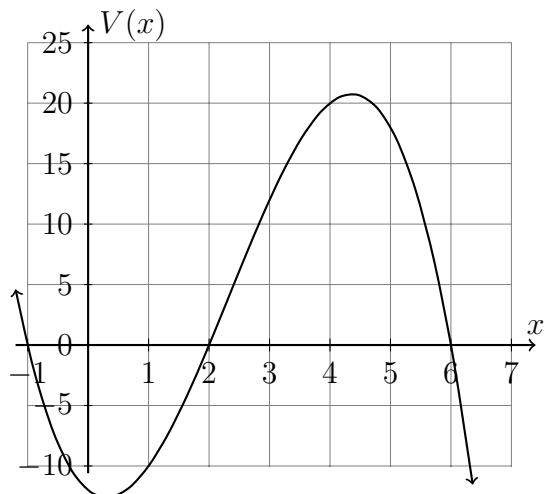
(b) Write down the equation of the vertical asymptote to f .



4. Plot the function $h(x) = x^3 + x^2 - 6x$, labeling the x - and y -intercepts. Mark the local maximum and minimums as ordered pairs.



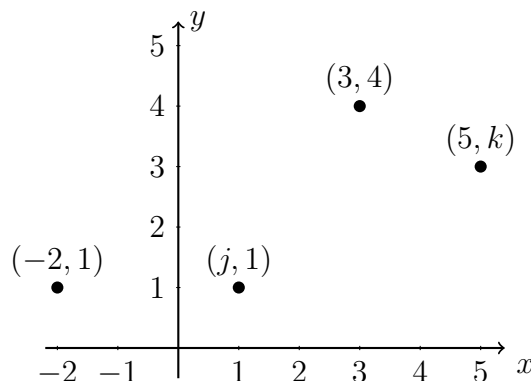
5. A cardboard box manufacturer is building boxes with length represented by $x + 1$, width by $6 - x$, and height by $x - 2$. The volume of the box is modeled below.



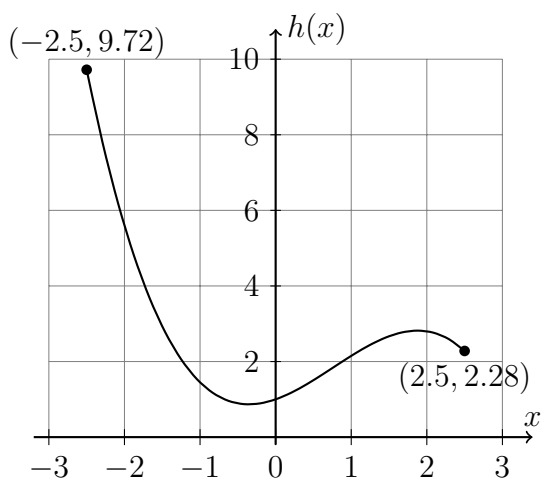
- Over what interval of positive x values is the volume positive?
- Estimate the maximum possible volume of the box.
- Find the value of x would maximize the volume of the box.

6. A function composed of four points $\{(-2, 1), (j, 1), (3, 4), (5, k)\}$ is plotted on the below.

- Write down j
- Write down k
- Write down the domain.
- Add an ordered pair to the relation so that it would *not* be a function.



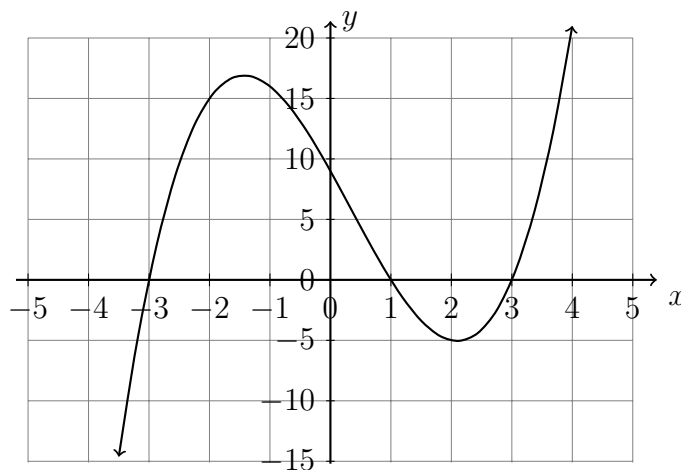
7. A ski jump is modeled by the cubic function $h(x) = 1.0 + 0.7x + 0.8x^2 - 0.35x^3$ where h is the height in meters above ground and x is the horizontal distance (m).



- The two ends of the ramp are marked as ordered pairs. How wide is the ramp in meters?
- What is the total vertical descent from the top of the ramp to its lowest point?

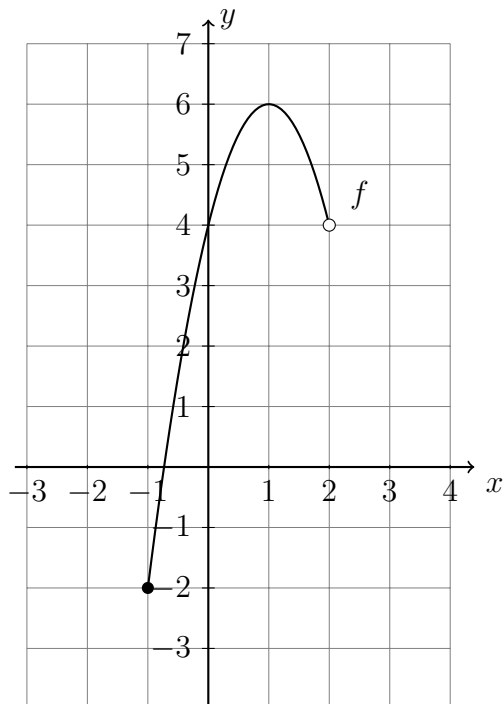
8. Shown in the plot below is the function $f(x) = x^3 - x^2 - 9x + 9$.

- (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.



9. The function $f(x) = ax^2 + bx + c$ is graphed below over its domain, $p \leq x < q$.

- (a) Write down the value of c .
- (b) Write down $f(-2)$.
- (c) Find x such that $f(x) = 6$.
- (d) Write down the values of p, q .
- (e) Write down the range of f .



10. A rational function of the form $f(x) = \frac{1}{x+p} + q$ is shown on the grid below.

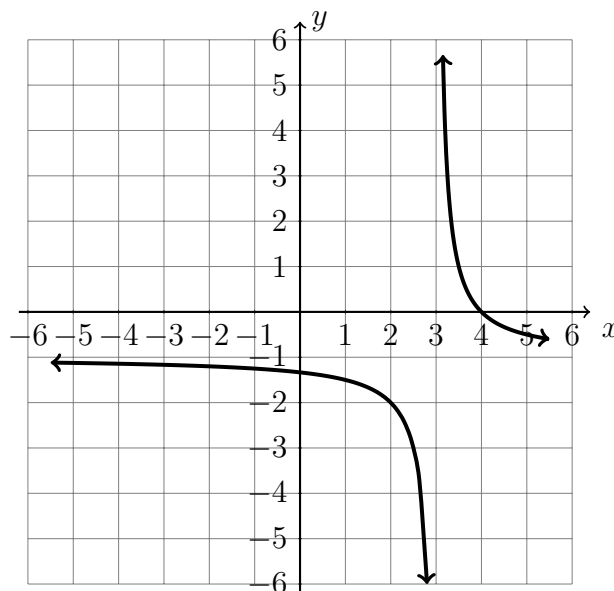
(a) Write down the equation of the horizontal asymptote.

(b) Write down the equation of the vertical asymptote.

(c) Hence, write down p and q .

(d) Find $f(0)$.

(e) Solve for x such that $f(x) = 0$.



11. The temperature (C°) over a 24 hour day starting at midnight is modeled by the function $f(t) = -0.0075t^3 + 0.17t^2 + 0.02t + 5$.

(a) Write down the temperature at midnight, when $t = 0$.

(b) Over what interval is the temperature increasing?

(c) Find the maximum temperature during the day.

