

Rational Functions: Asymptotes, Holes, and Graphs

Grade 11 – Algebra 2 math · Test · Standards: F-IF.C.7d, F-IF.B.4

Name: _____ Date: _____ Class: _____

This test covers the domain, asymptotes, holes, graphs, and applications of rational functions, including inverse variation. Factor and cancel before naming features, and write the equation of each asymptote. No calculator is needed. The test is worth 20 points.

Standards: F-IF.C.7d, F-IF.B.4 · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Domain and asymptotes (2 points)

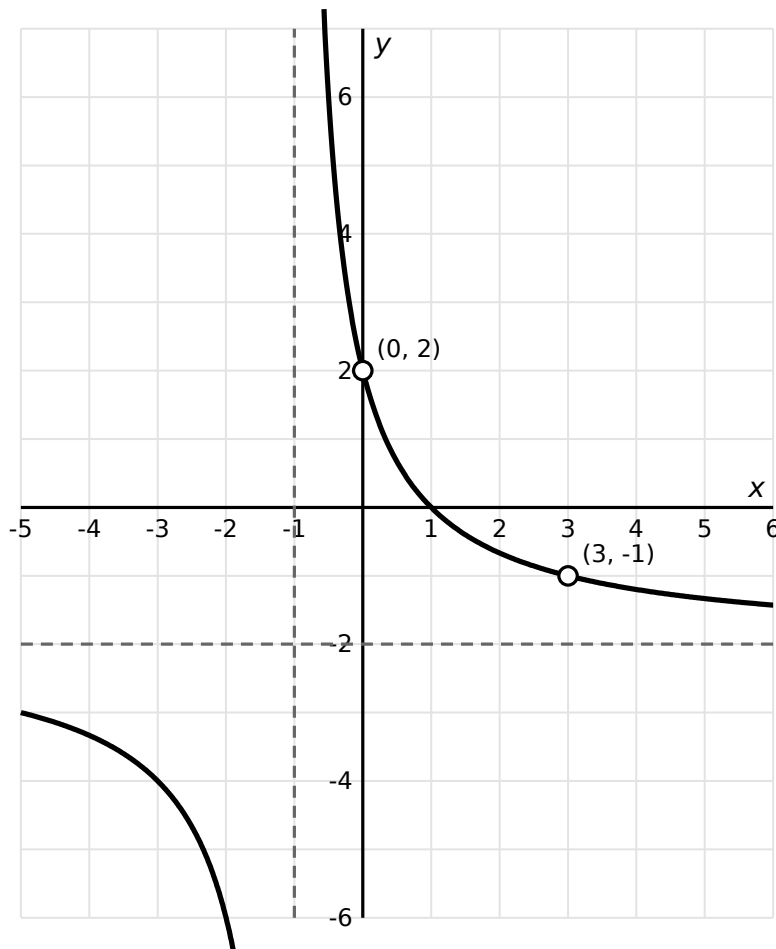
For $f(x) = \frac{(4x - 1)}{(x + 6)}$, state the domain, the vertical asymptote, and the horizontal asymptote.

Question 2 Transformations (2 points)

Describe the graph of $y = -\frac{7}{(x - 5)} - 2$ as a transformation of $y = \frac{1}{x}$.

Question 3 From graph to equation (3 points)

The graph of $y = \frac{a}{(x - h)} + k$ is shown with the points (0, 2) and (3, -1).



Graph of the function.

- Give the equations of both asymptotes. (1 point)
- Write the equation of the function. (2 points)

Question 4 Hole, asymptotes (3 points)

For $f(x) = \frac{(x^2 - x - 20)}{(x^2 - 25)}$, find the hole, the vertical asymptote, and the horizontal asymptote.

Question 5 Inverse variation (3 points)

The quantity y varies inversely with x , and $y = 8$ when $x = 7$.

- Determine the constant of variation and write the equation. (1 point)
- Calculate y at $x = 14$. (1 point)
- Determine the value of x that produces $y = 2$. (1 point)

Question 6 Average cost (3 points)

The average cost per item for a school print shop is $A(n) = \frac{(5n + 900)}{n}$ dollars when n items are printed.

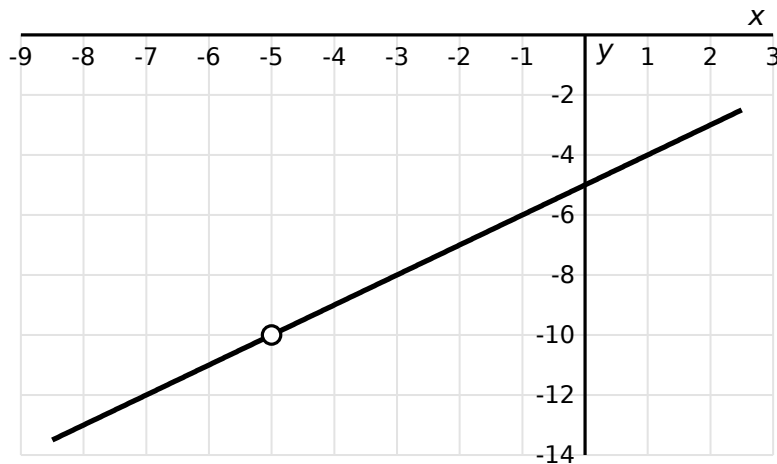
- Find the average cost for 150 items. (1 point)
- Find the number of items for an average cost of \$8. (1 point)
- Identify the horizontal asymptote and explain its meaning in this context. (1 point)

Question 7 Rewrite and identify (2 points)

Rewrite $y = \frac{(4x - 7)}{(x - 3)}$ in the form $y = \frac{a}{(x - h)} + k$ and name both asymptotes.

Question 8 A hole on a graph (2 points)

The figure displays the graph of $f(x) = \frac{(x^2 - 25)}{(x + 5)}$.



A line with a hole.

- Name the coordinates of the hole. (1 point)
- Write the domain in words. (1 point)