

Algebra 2 · Rational Functions and Their Graphs · Test

Common Core F-IF.C.7d, F-IF.B.4 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This test covers domain, asymptotes, holes, graphing and inverse variation for rational functions. It has eight questions worth 20 points in total. Show your work, write answers in simplest form, and use a straightedge for dashed asymptotes. Calculators are optional.

Test information

- **Grade:** Algebra 2
- **Chapter:** Rational Functions and Their Graphs
- **Common Core:** F-IF.C.7d, F-IF.B.4
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 3 pts; Question 3: 3 pts; Question 4: 2 pts; Question 5: 3 pts; Question 6: 2 pts; Question 7: 3 pts; Question 8: 2 pts)

Question 1: Domain and asymptotes (2 points)

Let $f(x) = \frac{2x+1}{x-4}$.

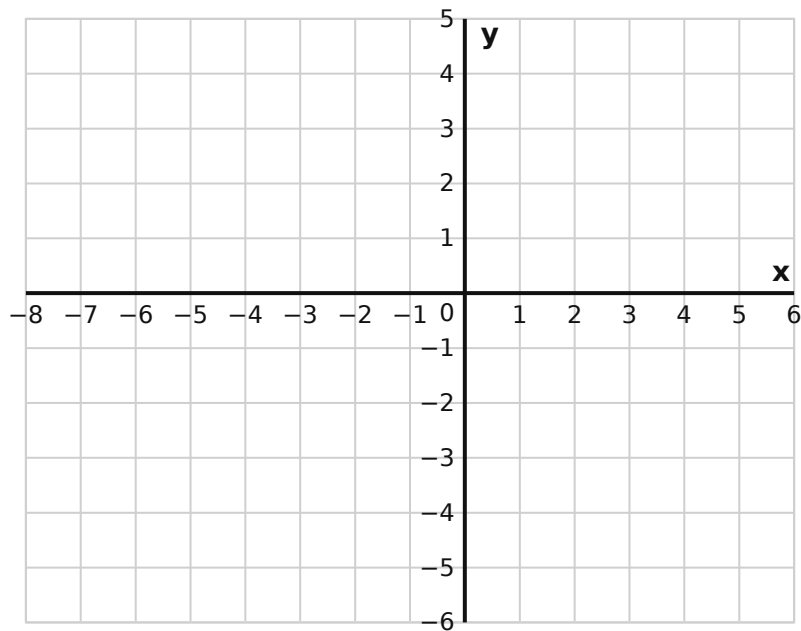
- a. State the domain and the vertical asymptote. (1 point)
- b. State the horizontal asymptote. (1 point)

Question 2: Hole and asymptotes (3 points)

Let $f(x) = \frac{x^2-x-12}{x^2-9}$. Find the coordinates of the hole, the equation of the vertical asymptote, and the equation of the horizontal asymptote.

Question 3: Graph a rational function (3 points)

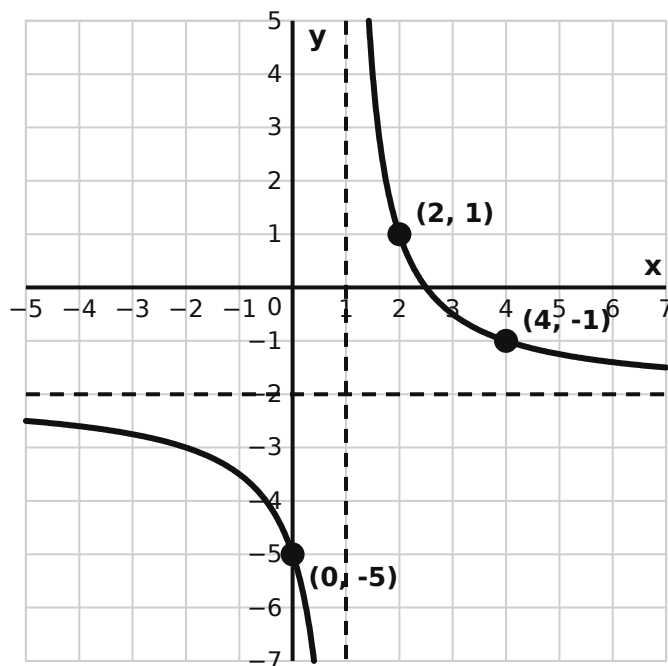
Graph $y = \frac{3}{x+2} - 1$. Draw the asymptotes as dashed lines and plot at least four points.



Blank grid.

Question 4: Equation from a graph (2 points)

Write an equation of the form $y = \frac{a}{x-h} + k$ for the graph.



Dashed lines are the asymptotes.

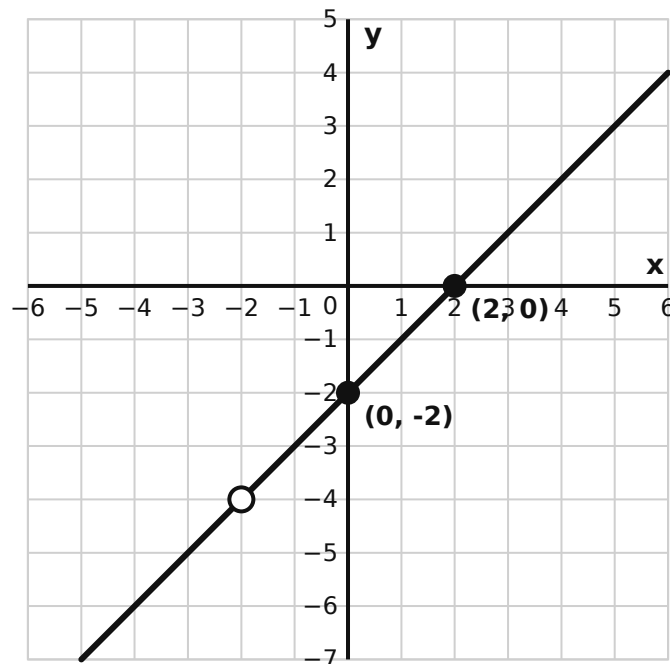
Question 5: Inverse variation (3 points)

The variable y varies inversely with x , and $y=9$ when $x=4$.

- Write an equation relating x and y . (1 point)
- Find y when $x=12$. (1 point)
- Find x when $y=2.25$. (1 point)

Question 6: Graph with a hole (2 points)

The graph of $f(x) = \frac{x^2-4}{x+2}$ is shown.



A line with one open circle.

- Give the coordinates of the open circle. (1 point)
- State the domain of f . (1 point)

Question 7: Driving time (3 points)

Sofia drives 180 miles. The time is $t = \frac{180}{r}$ hours at an average speed of r miles per hour.

- Find the time at 45 mph. (1 point)
- Find the speed that gives a time of 2.5 hours. (1 point)
- Describe what happens to t as r gets very large, and name the horizontal asymptote. (1 point)

Question 8: Average cost (2 points)

Liam prints T-shirts. The setup costs \$120 and each shirt costs \$4 to print. The average cost per shirt for n shirts is $C(n) = \frac{4n+120}{n}$ dollars.

- Find the average cost for 30 shirts. (1 point)
- How many shirts give an average cost of \$5? (1 point)