

Precalculus - Rational Functions and Asymptotes - Worksheet

Common Core A-APR.D.7, F-IF.C.7d, A-CED.A.1 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice rational functions and their graphs (Common Core A-APR.D.7, F-IF.C.7d and A-CED.A.1). You will find domains, asymptotes, holes and intercepts, solve rational equations and inequalities and work with applications.

Precalculus · Common Core State Standards: **A-APR.D.7, F-IF.C.7d, A-CED.A.1**

Exercise 1 - Domain

Find the domain of $f(x) = \frac{x+1}{x^2-5x+6}$.

Exercise 2 - Hole and asymptote

Find the vertical asymptote and hole of $f(x) = \frac{x^2-9}{x^2-x-6}$.

Exercise 3 - Equal degrees

Find the horizontal asymptote of $f(x) = \frac{6x^2-5}{2x^2+x}$.

Exercise 4 - Lower numerator degree

Find the horizontal asymptote of $f(x) = \frac{2x+1}{x^2+3}$.

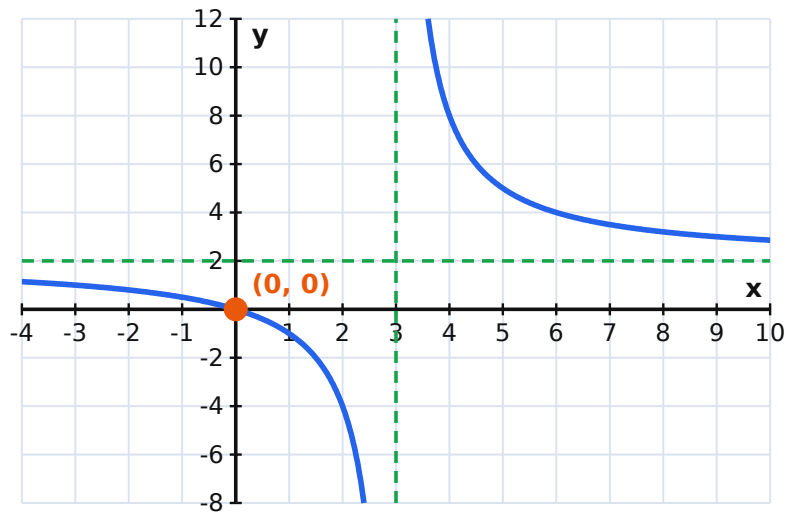
Exercise 5 - No horizontal asymptote

Does $f(x) = \frac{x^4+1}{x^2-1}$ have a horizontal or slant asymptote?

Exercise 6 - Intercepts

Find the intercepts of $f(x) = \frac{2x-6}{x+4}$.

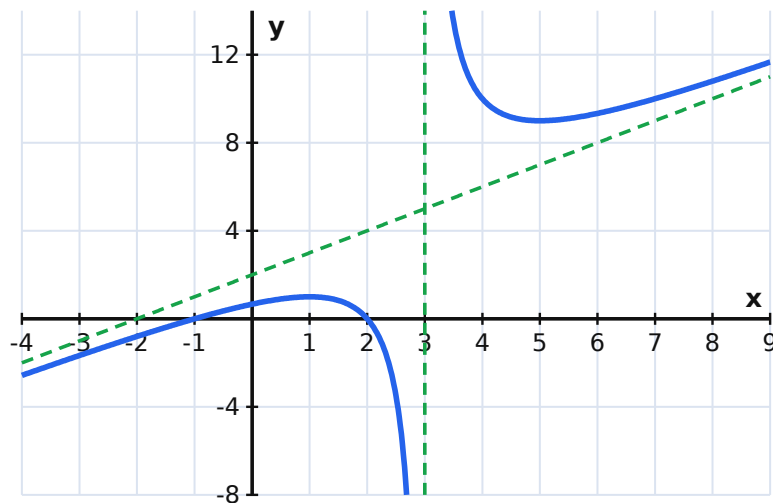
Exercise 7 - Read a graph



Graph of a rational function.

The graph of $f(x) = \frac{2x}{x-3}$ is shown. State the equations of the asymptotes and the intercept.

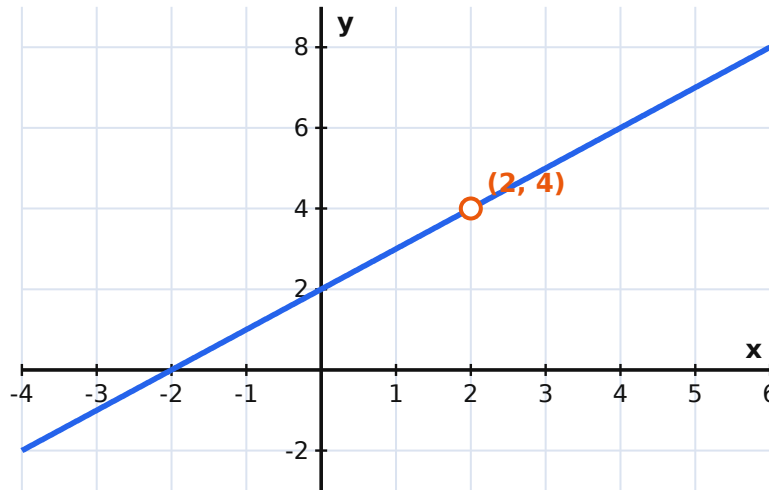
Exercise 8 - Slant asymptote



Graph of f .

Find the slant asymptote of $f(x) = \frac{x^2 - x - 2}{x - 3}$.

Exercise 9 - Find the hole



Graph with a missing point.

Find the coordinates of the hole in the graph of $f(x) = \frac{x^2 - 4}{x - 2}$.

Exercise 10 - Solve a proportion

Solve $\frac{3}{x-1} = \frac{2}{x+2}$.

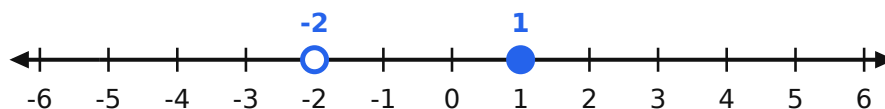
Exercise 11 - Solve with two fractions

Solve $\frac{2}{x} + \frac{3}{x+1} = 2$.

Exercise 12 - Extraneous solution

Solve $\frac{x}{x-3} = \frac{3}{x-3} + 2$.

Exercise 13 - Rational inequality



Critical values -2 and 1.

Solve $\frac{x-1}{x+2} \geq 0$.

Exercise 14 - Write an equation

Write a rational function with vertical asymptote $x = 2$, horizontal asymptote $y = 3$ and x -intercept -1 .

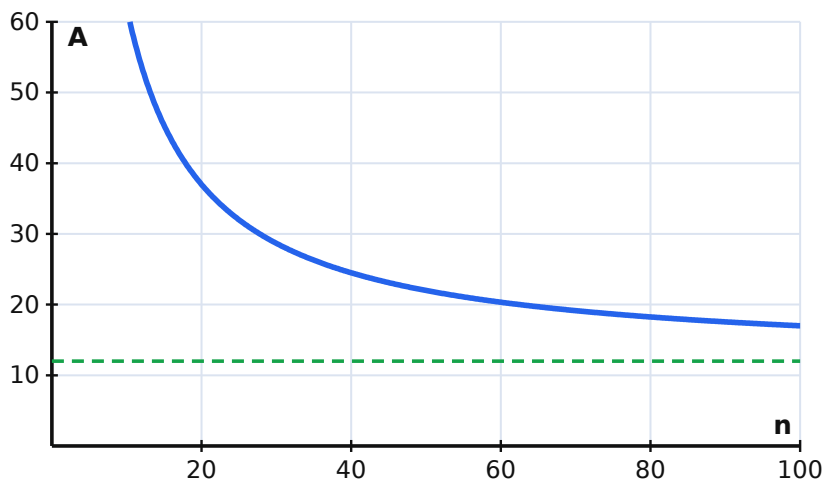
Exercise 15 - Behavior near an asymptote

For $f(x) = \frac{1}{x-2}$, find $f(2.01)$ and $f(1.99)$, and describe the behavior as $x \rightarrow 2^+$ and $x \rightarrow 2^-$.

Exercise 16 - Hole and asymptote together

Simplify $f(x) = \frac{(x-1)(x+3)}{(x-1)(x-5)}$ and find the hole and vertical asymptote.

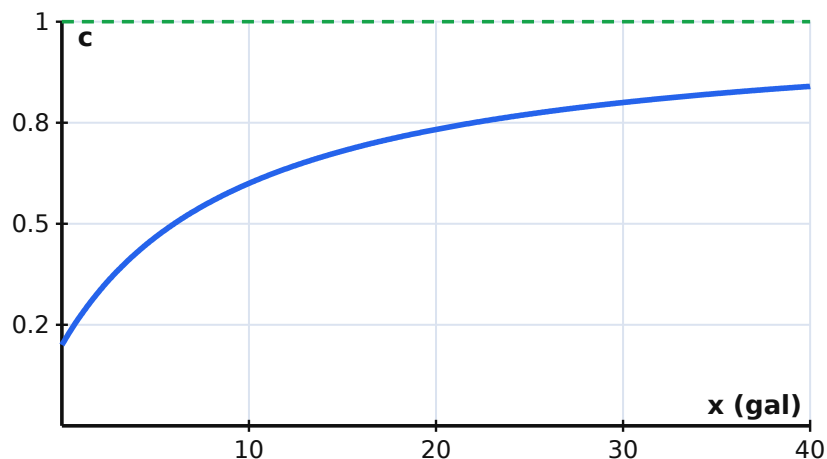
Exercise 17 - Average cost of shirts



Average cost per shirt.

Printing n shirts for the school store costs \$500 plus \$12 per shirt, so the average cost per shirt is $A(n) = \frac{500+12n}{n}$. Find $A(50)$, identify the horizontal asymptote and explain it, and find the smallest whole n for an average of at most \$15.

Exercise 18 - Salt mixture



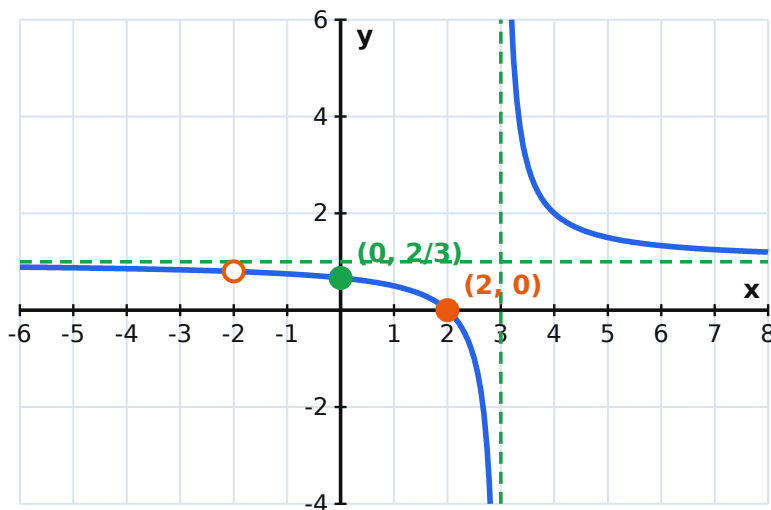
Salt fraction after adding salt.

A tank holds 10 gallons of a 20% salt solution. Aisha adds x gallons of pure salt. The salt fraction is $c(x) = \frac{2+x}{10+x}$. Find the horizontal asymptote and find x for a 50% solution.

Exercise 19 - Painting a fence

Jamal takes 3 hours less than Mei to paint a fence alone. Together they take 2 hours. Let x be Mei's time. Solve $\frac{1}{x} + \frac{1}{x-3} = \frac{1}{2}$ and find both times.

Exercise 20 - Complete analysis



Graph of f .

For $f(x) = \frac{x^2-4}{x^2-x-6}$, find the hole, vertical asymptote, horizontal asymptote and both kinds of intercept.