

Accelerated Math 3

Topics and Suggested Review Problems – Test 6

Test 6 will focus on rational functions and inequalities. The test will also include problems on sequences and series, solving equations, and solving log and exponential equations.

Sequences and series

- Name the type of sequence (arithmetic, geometric, neither) for each of the following and determine the common ratio or difference as appropriate:
 - 9, 5, 1, ...
 - $1, \frac{7}{6}, \frac{4}{3}, \frac{3}{2}, \dots$
 - $\frac{1}{5}, -1, 5, -25, \dots$
 - 2, 2.6, 3.38, 4.394, ...
 - 2, 0, 4, 10, ...
- Which of the following infinite geometric series converge and to what value?
 - $200 + 100 + 50 + \dots$
 - $50 + 75 + 112.5 + \dots$
 - $-3 + 0.9 - 0.27 + 0.081 + \dots$
 - $-5 + 5.5 - 6.05 + 6.655 + \dots$
- For each of the following, find the requested information:
 - $9 + 5 + 1 + \dots$; find S_{10}
 - skip for now
 - $53 + 57 + 61 + \dots$; find n for which $S_n = 3330$

Rational functions.

For each of the following functions find the following characteristics:

- | | | |
|---------------------------|--------------------|----------------------|
| (a) vertical asymptotes | (d) y intercepts | (g) slant asymptotes |
| (b) horizontal asymptotes | (e) holes | (h) end behavior |
| (c) x intercepts | (f) domain | |
- $f(x) = \frac{x^2 - 4}{x^2 + 5x - 14}$
 - $h(x) = \frac{4x^2 - 1}{x^2 + 4}$
 - $g(x) = \frac{x^3 - x^2 - x + 1}{x^2 + 1}$
 - $i(x) = \frac{2x}{x^2 - 4}$

Decompose each of the following rational functions using partial fractions.

- $f(x) = \frac{-4(x+11)}{x^2 + 2x - 15}$
- $g(x) = \frac{3x - 37}{x^2 - 3x - 4}$

Solving equations

- $\sqrt{x+2} = x - 4$
- $\frac{x}{5} - \frac{3x}{4} = 2 - \frac{x}{8}$
- $(x+5)^2 + (2x-7)^2 = 82$
- $x^4 - 5x^2 - 36 = 0$
- $\sqrt{2x} = \sqrt{x+1} + 1$
- $|3x - 5| - 7 = 0$
- $(x+3)^2 = (x-5)^2$
- $x + \frac{12}{x} = 7$
- $\frac{x-3}{x} - \frac{3}{x+1} + \frac{3}{x^2+x} = 0$
- $\frac{2}{x-1} + x = 5$
- $x - \frac{3x}{x+2} = \frac{6}{x+2}$

Solving log and exponential equations

See the worksheet that we did for homework (p. 331, Section 3.5), #2-18, 26-38 (even)

Solving rational inequalities

- $\frac{x^2 - 2x - 8}{x+1} \geq 0$