

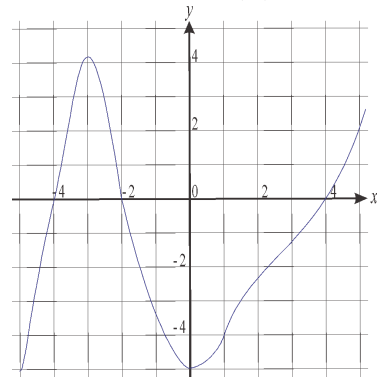
Homework 18 for March 29, 2026.

Algebra.

Review the classwork handout. Try solving the following problems.
Remember: you do not necessarily need to solve all problems, just solve as many as you can within the time you can dedicate to Math 9 homework.

1. From the picture, find in which interval(s) the function $y = f(x)$

- a. is monotonic
- b. has the same sign



2. Find all possible values of a such that equation $x^2 + ax + 9 = 0$ has two different roots, both of which are less than -1 .

3. Draw graphs of the following functions

a. $y = \left| \frac{1}{x-2} + 1 \right|$

b. $y = \frac{1}{|x|-2} + 1$

4. Solve the following equations

a. $3 \cdot 4^x + \frac{1}{3} \cdot 9^{x+2} = 6 \cdot 4^x - \frac{1}{2} \cdot 9^{x+1}$

b. $\sqrt{\log_x \sqrt{x}} = -\log_x 5$

c. $\frac{(9-2^x)}{3-x} = 1$

d. $\log_a x + \log_{a^2} x + \log_{a^3} x = 11$

e. $2^{x-1} + 2^{x-4} + 2^{x-2} = 6.5 + 3.25 + 1.625 + \dots$

f. $9^x + 6^x = 2^{2x+1}$

g. $4^{\log x + 1} - 6^{\log x} - 2 \cdot 3^{\log x^2 + 2} = 0$

h. $(x^2 - x - 1)^{x^2 - 1} = 1$

i. Find integer root of : $\log_{\sqrt{x}}(x + 12) = 8 \log_{x+12} x$

j. $\log_{x+3} \left(3 - \sqrt{1 - 2x + x^2} \right) = \frac{1}{2}$

5. The equation $4^x + 10^x = 25^x$ has a single root. Find this root. Is it positive or negative? Is it larger or less than 1?

6. Show that:

$$\log_3 2 \cdot \log_4 3 \cdot \log_5 4 \cdot \log_6 5 \cdot \log_7 6 \cdot \log_8 7 = \frac{1}{3}$$