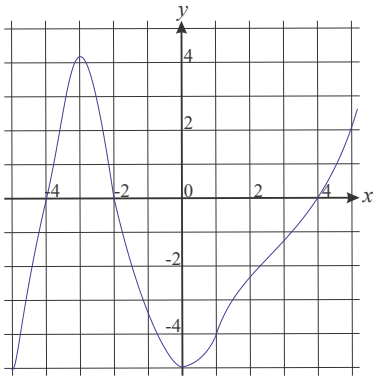
Homework for March 29, 2026.

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. (Skanavi 7.141) $3 \cdot 4^x + \frac{1}{3} \cdot 9^{x+2} = 6 \cdot 4^x - \frac{1}{2} \cdot 9^{x+1}$
   b. (Skanavi 7.143) $\sqrt{\log_x \sqrt{x}} = -\log_x 5$
   c. (Skanavi 7.153) $\frac{\log_2(9-2^x)}{3-x} = 1$
   d. (Skanavi 7.160) $\log_a x + \log_{a^2} x + \log_{a^3} x = 11$
   e. (Skanavi 7.184) $2^{x-1} + 2^{x-4} + 2^{x-2} = 6.5 + 3.25 + 1.625 + \cdots$
   f. (Skanavi 7.190) $9^x + 6^x = 2^{2x+1}$
   g. (Skanavi 7.197) $4^{\log x+1} - 6^{\log x} - 2 \cdot 3^{\log x^2+2} = 0$
   h. (Skanavi 7.299) $(x^2 - x - 1)^{x^2-1} = 1$
   i. (Skanavi 7.304) find integer root: $\log_{\sqrt{x}}(x + 12) = 8 \log_{x+12} x$
   j. (Skanavi 7.308) $\log_{x+3}\left(3 - \sqrt{1 - 2x + x^2}\right) = \frac{1}{2}$
5. (Skanavi 7.277) 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. (Skanavi 7.280) Show that:

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