

Rational Functions Review

Review is due on the day of your test. As always, show ALL work and answers on a separate sheet of paper. You will not receive any credit for work/answers written on this page.

***The non-calculator questions are noted with an asterisk.**

*1. Write the equation in logarithmic form: $2^6 = 64$.

Evaluate the logarithm.

*2. $\log_3 9$

*3. $\log_2 32$

*4. Write the equation $\log_8 4 = \frac{2}{3}$ in exponential form.

Write the expression as a single logarithm.

*5. $2\log_8 t + 5\log_8 x$

*6. $3\ln x - \ln y$

*7. Expand the logarithmic expression: $\log_2 10q^4$.

8. Solve $5^{8x} = 52$. Round to the nearest ten-thousandth.

9. Solve $\ln(2x + 6) = 7$. Round to the nearest thousandth.

10. Solve $3\log 2x = 6$.

Describe the combined variation that is modeled by the formula or equation.

*11. $A = \pi r^2$

*12. $b = \frac{2A}{h}$

Describe the vertical asymptote(s) and hole(s) for the graph of the following functions.

*13. $y = \frac{(x-4)(x+5)}{(x+5)(x-5)}$

*14. $y = \frac{x^2 + 2x + 1}{x^2 + x - 6}$

Is the relationship between the variables in the table a direct variation, an inverse variation, or neither? If it is a direct or inverse variation, write a function to model it.

15.

x	7	8	11	14
y	-133	-152	-209	-266

16.

x	-8	-6	-5	-1
y	$\frac{15}{4}$	5	6	30

17. Suppose that x and y vary inversely, and $x = 8$ when $y = 9$. Write the function that models the inverse variation.

18. The values (4.4, 11) and (x, 9) are from an inverse variation. Find the missing value and round to the nearest hundredth.

19. A dance team is planning a bus trip to a competition in Florida. The cost per person for the bus rental varies inversely as the number of people going on the trip. It will cost \$25 per person if 48 people go on the trip. How much will it cost per person if 62 people go on the trip? Round your answer to the nearest cent, if necessary.

20. Suppose that y varies jointly with w and x and inversely with z and $y = 18$ when $w = 2$, $x = 12$ and $z = 8$. Write the equation that models the relationship. Then find y when $w = 3$, $x = 2$ and $z = 6$.
21. A cell phone company found that the number N of phones sold varies directly with their advertising budget A and inversely with the price P of each phone. The company sold 6200 phones when \$20,000 was spent on advertising and the price of a phone was set at \$100. Determine the number of phones sold when the amount spent on advertising is increased to \$48,000. Round to the nearest whole number.
22. Write an equation for the translation of $y = \frac{-4}{x}$ that has the asymptotes $x = -6$ and $y = 2$.

Find any points of discontinuity for the rational function.

*23. $y = \frac{(x+2)(x-2)(x+4)}{(x-1)(x-8)}$

*24. $y = \frac{x-8}{x^2-x-30}$

Find the horizontal asymptote (if any) of the graph of the following functions.

*25. $y = \frac{-6x^4 - x + 6}{3x^6 - 7x + 6}$

*26. $y = \frac{6x^3 - 7x + 10}{2x^3 + 3x + 10}$

Graph the function.

*27. $y = \frac{-3}{x}$

*28. $y = \frac{4}{x}$

Sketch the asymptotes and graph the function.

*29. $y = \frac{-2}{x-3} - 3$

*30. $y = \frac{3}{x-1} - 1$

Find the vertical and horizontal asymptotes and holes for each function. Then sketch a graph.

*31. $y = \frac{x^2 - 4x - 5}{x - 5}$

*32. $y = \frac{x-3}{x^2 - 5x + 6}$

Simplify the rational expression. State any restrictions on the variable.

33. $\frac{a^2 + 3a - 18}{a + 6}$

34. $\frac{x^2 + 9x + 14}{x^2 + 3x - 28}$

Multiply or divide. State any restrictions on the variables.

35. $\frac{a^2}{8b^3} \cdot \frac{3b^5}{8a^3}$

36. $\frac{a^2}{a+3} \cdot \frac{a^2 - 2a - 15}{a^2 - 1a}$

37. $\frac{x^2 + x - 2}{x+3} \cdot \frac{x^2 - 7x - 30}{2x^2 - x - 1}$

38. $\frac{w+2}{w+1} \div \frac{w-5}{w^2 + 3w + 2}$

39. $\frac{x^2 - 9}{x^2 + 5x + 6} \div \frac{x^2 + 2x - 15}{x^2 + x - 20}$