

## Intermediate Algebra Practice Problems

1. Solve the radical equation.

$$\sqrt{p+2} - p\sqrt{3} = 0$$

2. Solve the equation of quadratic form.

$$2m - 3m^{\frac{1}{2}} - 2 = 0$$

3. Solve the quadratic inequality. Then graph the solution set.

$$x^2 - 10x + 21 \geq 0$$

4. Solve the rational inequality. Then graph the solution set.

$$\frac{2x+5}{x-4} < 0$$

5. Find the domain of the function.

$$y = \frac{2x+3}{x^2-36}$$

6.  $f(x) = 3x - 2$                        $g(x) = x^2 + 2x$

a) Determine  $(f + g)(3)$

b) Determine  $(f - g)(x)$

c) Determine  $(fg)(x)$

d) Determine  $\left(\frac{g}{f}\right)(5)$

e) Determine  $(f \circ g)(x)$

7. Graph the function and label key points.

$$g(x) = -\frac{2}{5}x + 3$$

8. Graph the function and label key points.

$$y = x^2 - 4x + 3$$

9. Graph the function by writing the equation in standard form and label key points.

$$x = 2y^2 - 4y + 5$$

10. Graph the function by writing the equation in standard form and label key points.

$$x^2 + y^2 - 6x + 10y + 30 = 0$$

11. Graph the function by writing the equation in standard form and label key points.

$$4(x-1)^2 + 9y^2 = 36$$

12. Graph the function.

$$f(x) = \sqrt{x-1}$$

13. Graph the function.

$$f(x) = |x| - 1$$

14. Graph the function and state if it is increasing or decreasing.

$$y = \left(\frac{1}{3}\right)^{x-1}$$

15. Graph the function.

$$y = \log_3 4x$$

16. Determine if the function is one-to-one. If it is, then find  $f^{-1}$  and graph  $f$  and  $f^{-1}$  on the same axis.

$$f(x) = x^2 - 1 \quad (x \geq 0)$$

17. Evaluate each logarithm.

a)  $\log_3 3$

b)  $\log_8 1$

c)  $\log_5 \sqrt[3]{25}$

18. Convert each equation to logarithmic form.

a)  $81^{\frac{1}{4}} = 3$

b)  $625 = 5^4$

19. Using the equation  $Q = 75(2)^{-t/20,000}$  find the quantity remaining after 50,000 years.

20. Find the unknown in each equation.

a)  $\log_4(x^2) = 3$

b)  $\log_x 81 = 4$

c)  $y = \log_{\frac{1}{2}} 16$

d)  $3^{x-2} = 4$

e)  $\log_3 8 = x$

f)  $30 = 4 \ln(x-1) + 14$

g)  $\log_2(x-1) + \log_2(x+1) = 4$

h)  $\log_3(8x) - \log_3(x-2) = 2$

21. Express as a single log with no coefficient.

$$\frac{1}{3} \log_a x + \frac{3}{5} \log_a y$$

22. Simplify the expression.

$$\log_3 \sqrt[4]{\frac{81x^5}{y^3}}$$

23. Normal human blood has a pH of 7.4. What is the hydrogen ion concentration of normal human blood?  $pH = -\log[H^+]$

24. Ann invested a total of \$12,000 in stocks, bonds, and mutual funds. She received a 10% return on her stock investment, an 8% return on her bond investment, and a 12% return on her mutual fund. Her total return was \$1230. If the total investment in stocks and bonds equaled her mutual fund investment, then how much did she invest in each?

25. Solve the system.

$$x + y = 4$$

$$2x - 3z = 14$$

$$2y + z = 2$$

26. Find all points of intersection.

$$9x^2 - 4y^2 = 36$$

$$2y = x - 2$$

27. Sketch the system of inequalities.  $x^2 + y^2 < 16$   
 $x + y < -2$

28. List the first three terms of the sequence whose  $n$ th term is

$$a_n = \frac{(-1)^n}{2^{n+1}}$$

29. Write a formula for the general term of the sequence.

a) 0, 1, 4, 9, 16, ...      b) 4, 7, 10, 13, 16, ...

c) 2, 6, 18, 54, ...

30. Write in expanded form.

$$\sum_{n=1}^5 (2n^2 - 1)$$

31. Write the series in summation notation.

$$\ln(2) + \ln(4) + \ln(6)$$

32. Find the  $n$ th term, then find the sum of the first 11 terms.

a)  $4, 1, -2, -5, \dots$       b)  $3, 6, 12, 24, \dots$

33. Find the sum of the infinite series.

$$6 + 4 + \frac{8}{3} + \frac{16}{9} + \dots$$

34. Use the definition of a binomial coefficient to find:

$$\binom{7}{3}$$

35. Use the binomial theorem to expand the binomial.

$$(x+3)^5$$

36. Find the fifth term of  $(p+m)^8$