



## Algebra I Proficiency Test

**Initial Date: Thursday, May 6 from 3:30-5 p.m.**

**Makeup Date: Thursday, May 13 from 4-5:30 p.m.\***

### Test Information:

- This test is required for all incoming freshman.
- Calculators are not allowed for this test.
- The test will take one hour (additional time is scheduled for giving instructions and getting settled).

### Topics include:

1. Algebra properties, such as distributive, associative and commutative.
2. Evaluating algebraic expressions and formulas.
3. Operations with rational numbers: add, subtract, multiply and divide.
4. Equation solving skills.
5. Inequality solving skills.
6. Ratio and proportion.
7. Percent and interest applications.
8. Problem solving skills and strategies.
9. Word problem applications.
10. Direct and inverse variation.
11. Skills with polynomials: add, subtract, multiply and divide.
12. Properties of exponents.
13. Scientific notation.
14. Factoring polynomials and polynomial equations.
15. Skills with rational expressions: add, subtract, multiply and divide.
16. Solving factorable and rational equations.
17. Functions and relations.
18. Graphing linear equations and inequalities.
19. Forms of linear equations: point-slope, slope-intercept and standard.
20. Graphing and solving linear systems.
21. Operations with radical expressions, including simplifying.
22. Absolute value equations and inequalities.
23. Solving radical equations.
24. Graphing quadratic equations.
25. Solving with the quadratic formula.

Items #21-24 should be covered by the end of the 8th grade, though we realize some students may not have studied them by mid-May.



\*Please make every effort to test on one of these dates. If you are unable to, please contact Dr. Duwel, [aduwel@presentationhs.org](mailto:aduwel@presentationhs.org).

Updated 3/29/2021

## Algebra I Proficiency Test Practice Questions

1. Subtract and simplify  $\frac{11}{14} - \frac{1}{2}$ 
  - a.  $\frac{5}{6}$
  - b.  $\frac{2}{7}$
  - c.  $\frac{5}{14}$
  - d.  $\frac{7}{9}$
2. Multiply  $-5(x - 4y - 2)$ 
  - a.  $-5x - 20y + 10$
  - b.  $5x - 20y - 10$
  - c.  $-5x + 20y + 10$
  - d.  $-5x + 20y - 10$
3. Solve  $y = \frac{u-x}{11}$  for  $u$ .
  - a.  $u = 11y - x$
  - b.  $u = \frac{x+y}{11}$
  - c.  $u = 11y + x$
  - d.  $u = \frac{11x}{y}$
4. Use the distance formula  $d = r \times t$  to find the unknown value.  $d = 143$  miles,  $r = ?$ ,  $t = 6.5$  hour
  - a. 24 mph
  - b. 26 mph
  - c. 22 mph
  - d. 20 mph
5. Solve  $P = 2(l + w)$  for  $l$ .
  - a.  $l = w + \frac{P}{2}$
  - b.  $l = \frac{P}{2} - w$
  - c.  $l = \frac{P+w}{2}$
  - d.  $l = \frac{P-w}{2}$
6. Simplify  $(-4x^3 - 2x^2 + 1) - (6x^3 + 9x^2 - 7)$ 
  - a.  $-10x^3 + 7x^2 - 6$
  - b.  $-10x^6 - 11x^4 - 6$
  - c.  $2x^3 + 7x^2 + 8$
  - d.  $-10x^3 - 11x^2 + 8$
7. Simplify  $7x^5 \cdot 9x^4$ 
  - a.  $16x^9$
  - b.  $63x^9$
  - c.  $63x^{20}$
  - d.  $16x$



8. Find the product:  $(d + 8)(d - 8)$

- a.  $2d^2 - 64d$       b.  $d^2 - 64$       c.  $d^2 - 16d - 64$       d.  $d^2 + 16d + 64$

9. Solve the equation:  $(4 - x)(2x + 10) = 0$

- a.  $x = -5, x = 4$       c.  $x = -5, x = -4$

- b.  $x = -10, x = 4$       d.  $x = 5, x = -4$

10.. In which quadrant the point  $(8, -3)$  lie?

- a. Q IV      b. Q II      c. Q III      d. Q I

11. Find the slope of the line perpendicular to  $y = -\frac{4}{7}x + 5$

- a.  $\frac{4}{7}$       b.  $-\frac{4}{7}$       c.  $\frac{7}{4}$       d.  $-\frac{7}{4}$

12. Simplify:  $\sqrt{50} + \sqrt{18}$

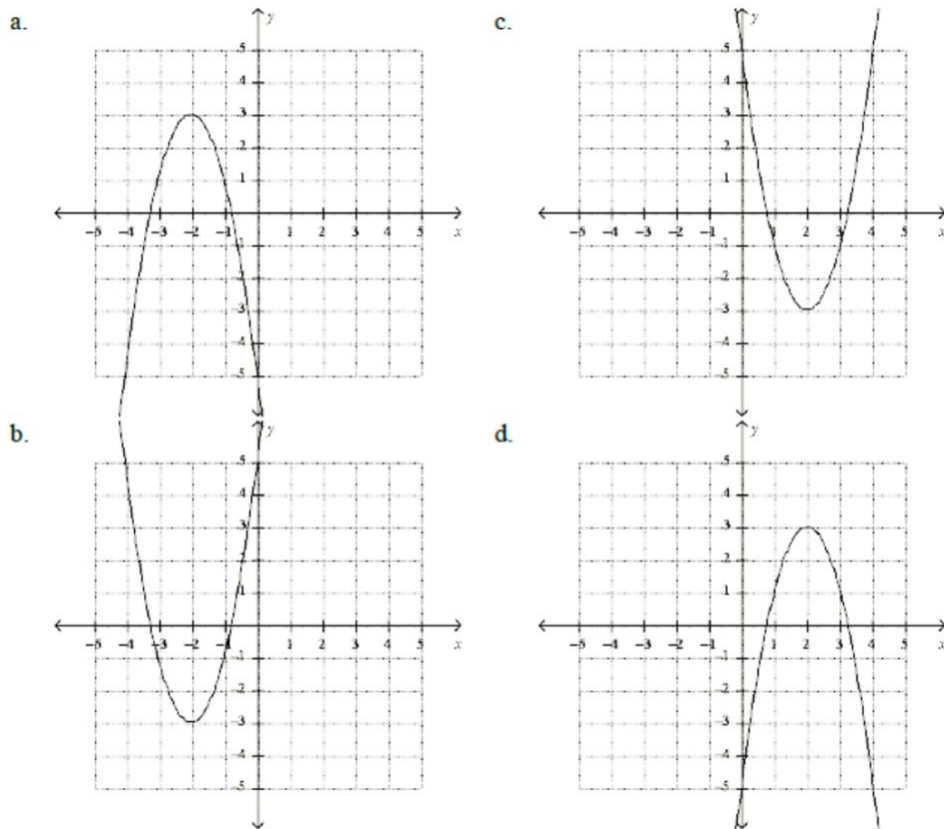
- a.  $2\sqrt{8}$       b.  $8\sqrt{2}$       c.  $\sqrt{68}$       d.  $35\sqrt{2}$

13. Factor  $x^2 + 18x + 80$ .

- a.  $(x + 8)(x + 10)$       b.  $(x + 18)(x + 80)$

- c.  $(x + 1)(x + 80)$       d.  $(x + 5)(x + 16)$

14. Graph the quadratic function  $y = 2(x - 2)^2 - 3$ .



15. How would you translate the graph of  $y = -x^2$  to produce the graph of  $y = -x^2 - 6$

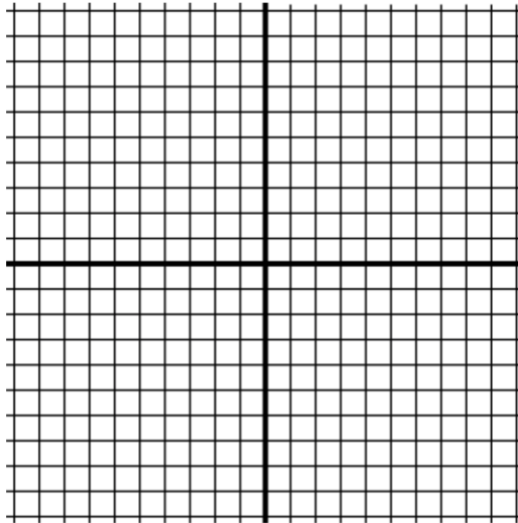
- a. Translate the graph of  $y = -x^2$  right 6 units
- b. Translate the graph of  $y = -x^2$  up 6 units
- c. Translate the graph of  $y = -x^2$  left 6 units
- d. Translate the graph of  $y = -x^2$  down 6 units

16. Complete the square for  $y = x^2 - 5x + \underline{\hspace{1cm}}$ . Then write the resulting expression as a binomial squared.

- a.  $\frac{25}{4}; (x + \frac{5}{2})^2$
- b.  $-\frac{25}{4}; (x - \frac{5}{2})^2$
- c.  $-\frac{25}{4}; (x + \frac{5}{2})^2$
- d.  $\frac{25}{4}; (x - \frac{5}{2})^2$



17. Suppose the probability distribution is represented by a histogram. Furthermore, suppose you can draw a vertical line through a histogram that divides the histogram into two parts that are mirror images. Which word is used to describe the shape of the distribution?
- a. Binomial    b. Random    c. Skewed    d. Symmetric
18. Sketch an example of a quadratic function with only one root.
19. Sketch an example of a quadratic function with maximum value and whose discriminant is equal to zero.
20. Sketch a system of equations (One quadratic and one line) that has no solution.
21. Simplify  $(5m^4n^5)(-2mn^2)(6m^2n^7)$ .
22. Simplify  $\frac{3}{3-\sqrt{6}}$ .
23. Find the product  $(4r + 3s)^2$ .
24. Solve the equation.  $(7x + 4)^2 = 64$
25. The sum of the areas of two square lots is 832 square feet and the difference between their areas is 320 square feet. Find the lengths of each lot.
26. Factor.      a.  $x^2 + 2x - 48$                       b.  $3x^2 + 11x + 10$
27. Graph the following quadratic. Find and graph the vertex. Mark at least five points.
- $y = x^2 - 4x + 3$
- Does it open up or down?
- How many roots?
- Highlight the axis of symmetry. Write the equation of the axis of symmetry.



**28. Multiply.**

a.  $(x - 1)(x + 1)$

b.  $(2x - 7)^2$

c.  $(2x - 7)(3x^2 - 4x + 5)$

**29. Factor completely.**

a.  $4x^2 - 24x - 28$

b.  $5x^2 - 45$

c.  $8x^3 + 24x^2 - 32x$

**30. Rationalize.**

a.  $\frac{7}{3-\sqrt{2}}$

b.  $\frac{5}{\sqrt{15}}$

**31. A person in the hot air balloon drops a sandwich over the edge from a height of 64 feet. The function  $h = -16t^2 + 64$  represents the height  $h$  (in feet) of the sandwich after  $t$  seconds. How long does it take the sandwich to hit the ground?**

**32. Find the inverse of the following functions.**

a.  $f(x) = 5x - 3$

b.  $f(x) = -3x + 1$



**33. Graph the following radical functions. Describe the domain and range of each.**

a.  $y = \sqrt{2x}$

b.  $y = \sqrt{x - 2}$

**34. Solve the following equations. Check for "Extraneous solutions".**

a.  $\sqrt{d + 2} = 7$

b.  $\sqrt{m - 4} - 8 = -3$

c.  $3\sqrt{x - 1} = 24$

**35. Solve the following inequalities and graph.**

a.  $4x - 3 \geq -27$

b.  $-10 \leq x - 3 < -2$

c.  $|4x - 3| \geq 3$

d.  $|2x + 1| < 5$

**36. Solve  $|3x - 4| + 3 = 8$ .**

**37. Solve.  $\frac{4}{7}x - 30 = -2$**

**38. Solve the equation.  $8x + 15 = 12x - 45$**

**39. Solve the equation.  $7(2x + 3) - 8 = 4(3x - 5) + 2x + 16$**

**40. Solve the following system of equations.**

a.  $4x + 3y = -7$

$-6x - y = 0$

b.  $y = 2x - 2$

$y = x^2 + 9x + 10$

*Key available upon request.*