



Algebra 2 Placement Test

This assessment will allow AHS math teachers to check to see if you have mastered the necessary Algebra 1 and Geometry skills necessary to move on to Algebra 2. No stress. This test will merely serve as a means for us, teachers, to meet you at your specific math level. We want to determine which topics you need to review or relearn and which topics you have already mastered. (No calculator)

(Part 1) Algebra 1 Content

Real Numbers and Their Properties

1) Describe the following types of numbers:

- (N) Natural Numbers- _____
- (W) Whole Numbers- _____
- (Int) Integers- _____
- (rat) Rational Numbers- _____
- (Ir) Irrational Numbers- _____
- (R) Real Numbers- _____

2) To which of the above set(s) do each of the following numbers belong? You may use the abbreviations next to each word.

- a. -2 _____
- b. 5 _____
- c. $\sqrt{2}$ _____
- d. $\frac{8}{9}$ _____

Simplifying Radicals

3) In your own words, what does a square root do? _____

4) Simplify each of the following. Assume all variables represent positive values.

a. $\sqrt{75x^2}$

b. $3\sqrt{25x^3}$

c. $\sqrt{6} \cdot \sqrt{14}$

d. $3\sqrt{2} - 5\sqrt{7} + 2\sqrt{7} - 4\sqrt{7}$

e. $\sqrt{27} + 2\sqrt{5} - \sqrt{75}$

f. $\sqrt{\frac{5}{4}}$

g. $\sqrt{\frac{4}{5}}$

Algebraic Expressions

5) What is the difference between an algebraic expression and an algebraic equation?

6) Order of operations says to simplify expressions in this order:

7) Evaluate each expression for the given value of x:

a. $x^3 \div 9 - 2x$ when $x = -3$

b. $\frac{(3x^2 - 5x) \div 2}{7x - 10}$ when $x = 5$

Example (using expected format)

Evaluate the expression WITHOUT using a calculator: $56 - 12 \div 3 \bullet 2$

$$56 - 12 \div 3 \bullet 2$$

$$56 - 4 \bullet 2$$

$$56 - 8$$

$$48$$

8) Evaluate each expression *without* using a calculator (like the previous example)

a. $16 \div (2(3^2 - 11) \div 4) + 5^2$

b. $\frac{2(5-7)^3}{\frac{1}{5}} + (15 \div 3 \bullet 2)$

9) Simplify the expressions below.

a. $-3(x^2 + 2x) - 5x(2x - 3)$

b. $(3a - 4b - 5) - (-4b + 9)$

c. $8z - 2(z - 4)$

d. $-3x(2x - 5y + 1)$

Example (using expected format)

Solve and check:

$$6x - 13 = 22 - x$$

$$7x - 13 = 22$$

$$7x = 35$$

$$x = 5$$

check:

$$6(5) - 13 = 22 - 5$$

$$30 - 13 = 17$$

$$17 = 17$$

10) Solve each equation. Check your solution.

a. $-3x + 14 = 11$

b. $4x - 12 = -3x + 9$

c. $\frac{1}{2}x - 8 = -3$

d. $6(-x - 5) = -4(x - 3) - x$

e. $3 - (2x + 9) = 17$

f. $\frac{2}{3}x - 2 = -\frac{3}{2}x - 4$

g. $3(2x + 8) - 7x = 30$

h. $(4x^2 - 1) - (4x^2 - x + 2) = -3$

11) Marina buys a couch for \$835. If the sales tax rate is 7.5%, what is Marina's bill?
Round your answer to the nearest cent.

12) A stadium which had 4500 seats last year was remodeled. IF the stadium has 27% more seats this year, how many seats does the remodeled stadium have?

13) Solve each of the following and graph the solution on the number line. The top space is for your answer, the second is for you to create a number line.

a. $-3x + 9 < 12$

b. $7x - 10 \geq 11$

c. $-\frac{2}{3}x - 4 \leq 8$

d. $-4 < 2x - 6 \leq 8$

e. $-3x + 5 < -1$ or $4x - 1 \leq 3$

Rewriting Equations and Formulas

14) Solve each of the following equations for y.

a. $6x + 3y = 9$

b. $5x - y = -3$

c. $2xy + 9y = 9$

d. $3(2x + 4y) = 12$

15) Rearrange each formula by isolating the indicated variable.

a. $A = \frac{1}{2}bh$ for b

b. $F = \frac{9}{5}C + 32$ for C

c. $A = \pi r^2$ for r

d. $P = 2(l + w)$ for w

16) Functions

Define/Describe the following:

Domain- _____ Function Notation- _____

Range- _____ Function- _____

Vertical Line Test- _____

17) Evaluate $f(x) = -x^2 + x - 2$ when $x = -2$ _____

18) Evaluate $j(x) = x^3 - 2x^2$ when $x = 9$ _____

19) Identify whether the relation $\{(2, -2), (3, 5), (3, 1), (8, 1)\}$ is a function. Then explain why or why not.

Slope

- 20) Draw an example of a line with:
a) positive slope, b) negative slope, c) zero slope, and d) undefined/no slope
- 21) Parallel Lines have _____ in common
- 22) Perpendicular lines intersect at a _____. Their equations contain _____ slope.
- 23) Find the slope of the lines that pass through the following pairs of points. Identify if the line is horizontal or vertical instead of a regular linear graph.
- a. $(-2,4)(4,8)$ b. $(2,7)(2,-65)$
- c. $(10,8)(1,1)$ d. $\left(\frac{2}{3}, \frac{7}{8}\right)\left(\frac{15}{17}, \frac{7}{8}\right)$
- 24) Determine if the lines determined below are parallel, perpendicular or neither.
- a. Line A contains $(3, 5)$ and $(-7, 1)$ Line B contains $(8,7)$ and $(6,2)$
- b. Line A contains $(3,5)$ and $(-7,1)$ Line B Contains $(4,-1)$ and $(-1,-3)$

Graphing Linear Equations

25) The y-intercept of a graph is _____

26) The x-intercept of a graph is _____

27) Identify the slope and y-intercept of each line.

a. $y = 7x + 9$

b. $3x - 5y = -6$

c. $y = 2$

d. $x = -8$

28) Find the x- and y-intercepts of each line.

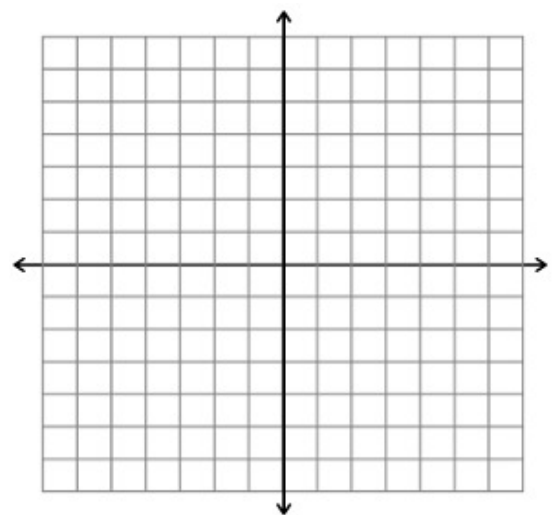
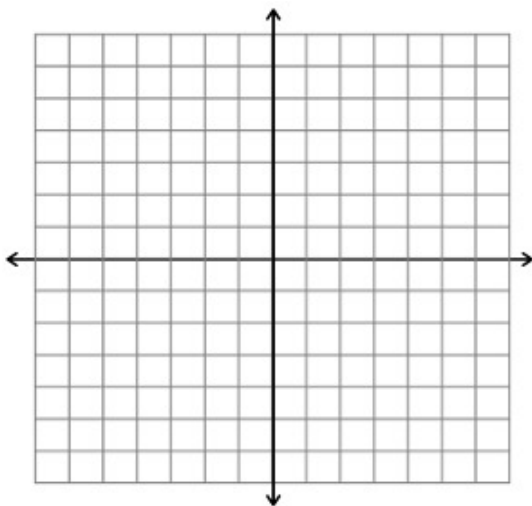
a. $7x - 8y = 56$

b. $y = 9x + 2$

29) Graph

a. $y = \frac{4}{5}x - 2$

b. $2x - 3y = 6$



Writing the Equations of a Line

- 30) Slope-Intercept Equation of a line is _____
- 31) Write the equation, in slope-intercept form, for each of the following line.
- a. slope = 4, y-intercept = 7 _____
- b. slope = $\frac{1}{2}$, through (-2, 8) _____
- 32) through (6, -2) and parallel to $y = 7x - 1$ _____
- 33) through (6, -2) and perpendicular to $y = 7x - 1$ _____
- 34) through (-1, 7) and (4, 0) _____
- 35) Write an expression to find the n th term of this arithmetic sequence.

Position	Value of Term
1	120
2	60
3	40
4	30
5	24
n	?

System of Equations

What is the solution to a system of equations? _____

Solve each system of equations below.

36)
$$\begin{cases} 2x + 5y = 12 \\ 2x + 3y = 8 \end{cases}$$

37)
$$\begin{cases} 3x - 2y = 10 \\ y = x + 3 \end{cases}$$

Translate each problem below into an equation and solve.

- 39) Taylor and Blair are driving away from each other in opposite directions. If Blair's speed is 70 mph and Taylor's speed is 80 mph, how many hours will it be before the two are 225 miles apart?
- 40) Adrian and Landry are employees at the Soap 'n Suds Car Wash. If Adrian can wash 3 cars per hour, and Landry can wash 5 cars per hour, how many hours will it take them to wash 56 cars?
- 41) Shaneka pays \$33 for 22 pounds of peanuts. If the price per pound is the same, how much will Shaneka have to pay in order to buy 15 pounds of peanuts?

Rules of Exponents

42) What do you do with the exponents when:

- Multiplying like bases _____
- Dividing like bases _____
- Have negative exponents in the numerator _____
- Have an exponent both inside and outside the parenthesis _____
- ANYTHING raised to the zero power is _____

43) Simplify each expression leaving variables with positive exponents only

a. $\frac{9c^4}{-3c^2}$

b. $5^{-2} \cdot 3^{-2} \cdot 4^0$

c. $\left(\frac{2c^4}{5d}\right)^3$

d. $\frac{(4c^2)(-cd^4)^5}{8c^4}$

e. $(4x)(7x^3)$

f. $(ab)^3$

g. $(-7x^2y)^3$

h. $\frac{-6m^3n^2}{18m^5n}$

Multiplying Polynomials

44) What do each of the following Polynomial descriptors mean:

- a) Monomial _____
- b) Binomial _____
- c) trinomial _____

45) Answer the following questions about double distributing:

- a) What does FOIL stands for? _____
- b) What is double distributing (or FOIL) is used for?

46) Multiply and simplify each of the following.

a. $(x+1)(x+4)$

b. $(x+1)(x-4)$

c. $(2x+y)(3x+4y)$

d. $(x+6)(x-6)$

e. $(x-2)(3x^2-6x+12)$

f. $(3x-4)^2$

Factoring

- 47) A factor by definition is _____
- 48) How do you know a polynomial contains a greatest common factor (GCF)?
- 49) A Difference of Squares is recognizable by these
-

Completely factor each of the following.

50) $n^2 + 4n - 12$

51) $5x^2 - 18x + 9$

52) $2m^2 - 22m - 52$

53) $4x^2 - 9y^2$

54) $6x^3y + 12x^2y^2 - 18x$

Operations with fractions

- 55) Perform the indicated operations without using a calculator. Simplify your answer, if possible.

a. $8\frac{1}{6} - 4\frac{5}{9}$

b. $\frac{3}{5} \div 12$

c. $\frac{2}{35} \cdot \frac{-5}{12}$

d. $(\frac{3}{5})^2 - \frac{2}{5} \div \frac{3}{4}$

Trigonometry

- 56) a) What is the Pythagorean theorem? _____
b) What does the Pythagorean theorem help you find?

c) When can you use the Pythagorean theorem?

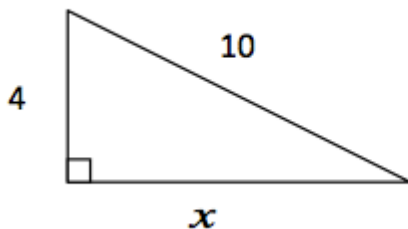
- 57) a) When can you use a trigonometric function?

b) What is sine ratio? $\sin \theta =$

c) What is cosine ratio? $\cos \theta =$

d) What is tangent ratio? $\tan \theta =$

- 58) Find the missing side. Give the exact answer as a simplified radical.



- 59) What is the distance between $A(2, -5)$ and $B(6, 3)$?

- 60) The following diagram shows a ladder leaning against a house. Find the height the ladder reaches up the wall?

