Basic Algebra Worksheet 1 — answers, directions, and links on following page

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

2.
$$2x + 3y = 8$$
$$4x - y = 2$$

3. If $(2x-1)^2 = ax^2 + bx + c$, what is $a + b + c$?

4. What are the solutions to $2x^2 + 3x = 5$?

5. What is the smallest factor of $x^3 - 9x$?

6. In an isosceles triangle, two of the angles are $(3x + 16)°$ and $(9x - 2)°$. What are the three possible values of x?

7. The slope between $(a, 5)$ and $(1, a)$ is -2. What is a?

8. Solve: $3(7 - 2x) < -2(x + 1)$

9. A map is gridded so that every letter is one inch apart on the horizontal axis and every number is one inch apart on the vertical axis. How far is it from a point in A4 to a point in G12?

10. If $f(x) = 7x + c$ and $f(-2) = -12$, what is $f(3)$?

Use the links below for additional practice for any questions that you miss, or find other links through or on your own.

1. 4   Solving proportions

For anything in an $\frac{a}{b} = \frac{c}{d}$ format: cross-multiply to get $ad = bc$, then solve.

2. $(1, 2)$ Solving a system of equations

Use substitution or elimination.

3. 1   FOILing/multiplying

Use FOIL to multiply $(2x - 1)(2x - 1)$. Note: $(2x - 1)^2 \neq (2x)^2 - 1^2$. Once you multiply correctly and combine like terms, $a, b,$ and c are the resulting coefficeints.

4. $-\frac{5}{2}$ and 1   Quadratic formula (or factoring)

This can be solved by getting one side $= 0$, then factoring. The Q.F. also works. Factoring and Q.F. both require getting one side $= 0$ first.

5. $x - 3$. Others are x and $x + 3$ Factoring

Factor out the x first, then factor the remaining $x^2 - 9$ as a difference of squares. Note that nothing in this question says that the expression $= 0$. Do not set the expression $= 0$. That is not what the question is asking for!

6. $3, 8$ and 10   Geometry/triangles

The isosceles triangle can have two $(3x + 16)°$ angles and one $(9x - 2)°$ that would add up to $180°$; two $(9x - 2)°$ angles and one $(3x + 16)°$ that would add up to $180°$; or the $(3x + 16)°$ and $(9x - 2)°$ angles can equal each other.

7. -3 Coordinate geometry: slope

Use the slope formula, $m = \frac{y2 - y1}{x2 - x1}$. Plug in the values you know, including m, and solve for a.

8. $x > \frac{23}{4}$ Inequalties/algebra

If you divide or multiply an inequality by a negative, change the direction of the $<$ or $>$.

9. 10   Coordinate geometry: distance

Make a right triangle. The distance formula and Pythagorean Theorem are the same thing.

10. 23   Functions

Plug in -2 for x and set that result $= -12$ to find c. Then find $f(3)$ knowing what c is.