Algebra Review Exercises

This worksheet is designed to help you brush up on the algebra skills you'll use in Math 111. You can refer to the textbook's prologue for help as you go along, or ask your instructor or TA. Also, the prologue has more review exercises if you would like additional practice.

You should be able to complete these review exercises without a calculator.

1. Solve for x.

   (a) $5 - x = 3x + 6$

   (b) $3(x - 1) - 1 = 2 - 5(x + 5)$

2. Find the equation of the line through the two points.

   (a) $(1, 4)$ and $(3, -2)$

   (b) $(3, -6)$ and $(0, 4)$

3. Find the intersection of the two lines.

   (a) $y - x = 1$ and $y + x = 3$

   (b) $9x - 2y = -4$ and $3x + 4y = 1$

4. Multiply and combine like terms:

   $$(4a - 5b)(3a + 7b) =$$

5. For each of these parabolas, find the highest point (if there is one) and tell where the parabola intersects the x-axis.

   (a) $y = -x^2 + 2x + 3$

   (b) $y = x^2 - 4x + 4$

6. Simplify, leaving your answer in fraction form:

   (a) $\frac{a}{b} + \frac{c}{d}$

   (b) $\frac{a}{c} \div (-c)$

   (c) $\frac{a}{c} \div \frac{b}{c}$

7. Find the average (mean) of each group of numbers.

   (a) 0, 5, and 7   (b) x, $3x$, $7x$, $10x$, and $3x$ (c) $s + 2$, $2s + 4$, and $3s + 9$

8. Solve the given equation for the indicated variable.

(a) $A = prs + pr^2$ for s

(b) $\frac{1}{R^2} = \frac{1}{r_1} + \frac{1}{r_2}$ for R

(c) $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2}$ for r_2

(d) $C = \frac{5}{9}(F - 32)$ for F

(e) $T = 2p\sqrt{\frac{L}{g}}$ for L

9. Which of these equations are correct, and which are bogus? (a, b are variables.)

(a) $\sqrt{a + b} = \sqrt{a} + \sqrt{b}$

(b) $\sqrt{a - b} = \sqrt{a} - \sqrt{b}$

(c) $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$

(d) $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

(e) $(a + b)^2 = a^2 + b^2$

(f) $(3a)^2 = 9a^2$

1. (a) $x = -\frac{1}{4}$; (b) $x = -\frac{19}{8}$

2. (a) $y = -3x + 7$ (b) $y = -\frac{10}{3}x + 4$

3. (a) $(1, 2)$ (b) $\left(-\frac{1}{3}, \frac{1}{2}\right)$

4. $12a^2 + 13ab - 35b^2$

5. (a) highest point: $(1, 13)$, intersects x-axis at $x = 1$, $x = 3$ (b) no highest point, intersects x-axis at $x = 2$

6. (a) $\dfrac{ad + bc}{bd}$; (b) $-\dfrac{a}{c^2}$; (c) $\dfrac{a}{b}$

7. (a) 4; (b) $\frac{24x}{5}$; (c) $2s + 5$

8. (a) $s = \frac{A - pr^2}{pr}$

   (b) $R = \sqrt{\frac{r_1 r_2}{r_1 + r_2}}$

   (c) $r_2 = \frac{Rr_1}{r_1 - R}$

   (d) $F = \frac{9}{5}C + 32$

   (e) $L = \frac{gT^2}{4p^2}$

9. (a) false; (b) false; (c) true; (d) true; (e) false; (f) true