2.7 Algebraic Expressions

In this worksheet you'll practice writing and evaluating algebraic expressions. Start by watching the video about Problem 1 and then try some of the problems on your own. If you want to get more practice with algebraic expressions, take a look at some of the additional resources at the end of the worksheet.

When you get to a starred (*) problem, try watching the video explaining how to solve the problem. Then try to solve the problem on your own. The first video in the Additional Resoure section introduces variables, just in case you aren't familiar with them.

1 Write an algebraic expression for each of the following:

    i The sum of a number and negative 27

    ii The sum of 6 and 3 times a number

    iii The product of 6 and the sum of 3 and a number

    iv *The absolute value of the difference of the squares of 6 and a number

2 Write an algebraic expression for the quotient of the sum of a number and 3.2 and the square of that number

    (a) $x + 3.2$

    (b) $x + \frac{3.2}{x^2}$

    (c) $\frac{1}{x} + 3.2$

    (d) $\frac{x+3.2}{x^2}$

3 Write an algebraic expression for the product of a number and the sum of its reciprocal and its square.

    (a) $x \cdot \frac{1}{x} + x^2$

    (b) $x \cdot (\frac{1}{x} + x^2)$

    (c) $x + \frac{1}{x} + x^2$
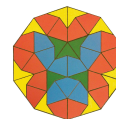
    (d) $x(\frac{1}{x} - x^2)$

4 Write an algebraic expression the reciprocal of the square of the quotient of a number and the difference of that number and 17.

    (a) $\frac{1}{(\frac{x}{x-17})^2}$

    (b) $(\frac{x}{x-17})^2$

    (c) $\frac{1}{(\frac{x^2}{x-17})}$

    (d) $x^2(x - 17)$

5 * A rectangular room is tiled with tiles $\frac{1}{2}$ inches long and $\frac{1}{2}$ inches wide. If the room is L tiles long and W tiles wide, find the room's area, in square inches.

   (a) $\frac{L}{2} \cdot \frac{W}{2}$

   (b) $L \cdot W$

   (c) $\frac{L}{2} \cdot W$

   (d) $\left(\frac{12L}{2}\right) \cdot \frac{12W}{2}$

6 A rectangular room is tiled with large tiles 2 feet long and 1 foot wide. If the room is L tiles long and W tiles wide, find the room's area, in square inches.

   (a) $2L \cdot W$

   (b) $L \cdot W$

   (c) $2L \cdot 12W$

   (d) $2 * 12L \cdot 12W$

7 I made x cookies. I ate the same number of cookies each day for 5 days. At the end of 5 days I had y cookies left. How many cookies did I eat each day?
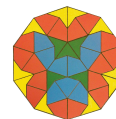
   (a) $\frac{x-y}{5}$

   (b) $\frac{y-x}{5}$

   (c) $x - y$

   (d) $x - 5y$

8 A television usually costs \$$x$, but this week it is being sold at 14% discount. A 11% sales tax will be charged when the television is purchased. How much will it cost in total?

   (a) $x \cdot .86 \cdot .11$

   (b) $x \cdot .86 + .11$

   (c) $x \cdot .86 \cdot 1.11$

   (d) $x \cdot .14 \cdot 1.11$

9 Simplify the following expressions

   i. $x + \frac{2x}{x}$

   ii. $x + x \cdot x + \frac{x \cdot x \cdot x}{x} + \frac{(x+x)(x \cdot x)}{x}$

   iii. $x(x + 4.5) + 3.2x$

   iv. *$(x + 3)(x + .8)$

10 Evaluate each expression in the above problem when $x = 5.1$

11 Evaluate the following expressions

    i. *$(x - y)(x + y)$ if $x = 4$ and $y = 2$

    ii. $x^2 + 2x + 4x \cdot x + 6 - 3x + \frac{2x}{x}$ if $x = -2$

    iii. $\sqrt{x + 23} - \sqrt{x - 4}$ if $x = 13$

Additional Resources:

1. A detailed solution to problem 1 iv: `https://www.youtube.com/watch?v=MnQCVu7ripM`

2. A detailed solution to problem 5: `https://www.youtube.com/watch?v=Yap6guEqzwo`

3. A detailed solution to problem 9 iv: `https://www.youtube.com/watch?v=OYnah58RpS4`

4. A detailed solution of problem 11 i: `https://www.youtube.com/watch?v=swqHckSU72w`

5. Khan Academy Algebraic Expressions Videos: click here for the video