Grade 9

Number Sense and Algebra: Algebraic Expressions & Equations

Play the **Late Delivery** game first! Levels 2 and 3 are recommended.
Click on http://www.bbc.co.uk/education/mathsfile/shockwave/games/postie.html or go to *www.wiredmath.ca* for the link.

1. Write an expression for each of the following.
   a. The sum of 12 and 9
   b. The product of 4 and 5
   c. 6 less than 7
   d. The product of x and y
   e. 4 less than w
   f. The quotient of x divided by y

2. Determine the value of $4x + 2$ when x is equal to each of the following.
   a. 3
   b. 7
   c. 4
   d. 0
   e. –3
   f. 11

3. Evaluate for $a = 2$ and $b = 7$.
   a. $a + 2b$
   b. $4b + 8a$
   c. $2a - b$
   d. $6a - b + 4$
   e. $16 - 2b - a$
   f. $3ab - 10$

4. Simplify.
   a. $11a + 3 - 7a + 8$
   b. $(7 + 4)w - 6w$
   c. $4r + 22 + 5s - 2r$
   d. $7x + 11 + 5y - 4x + 2$
   e. $11p - 8q - 4p - 5 + 7q + 8$
   f. $14c \div 2 - 5 \times 2d + 9$

5. Shannon earns $17 per hour teaching piano lessons.
   a. Write an expression for her earnings if she works n hours.
   b. Use the expression in part (a) to calculate her earnings for 7 hours of work.

6. a. Write an expression for the distance a car travels in t hours at a speed of s km/h.
   b. Use the expression in part (a) to calculate the distance a car travels while maintaining a constant speed of 80 km/h for 4.5 hours.

7. In a basketball game, the Raptors scored $8x + 41y + 17z$ points and the Lakers scored $6x + 43y + 14z$ points. In these expressions, x represents the value of a 3-point shot, y is the value of a 2-point shot and z is the value of a 1-point free throw.

   a. Which team won the game?
   b. How many 2-point shots did the Raptors score?

CHALLENGE YOURSELF!

8. A 600 metres long train travels through a 4200 metre tunnel. Two full minutes elapse from time the front of the train enters the tunnel until the last wagon exits the tunnel. What is the speed, in metres per second, of the train?

9. Four members of an investment club decide to buy shares in a company. They will divide the cost equally. Two new members join the club and agree to contribute equally to the shares. Their contribution results in a savings of $200 for each of the original four members. How much do the shares cost?

10. James and Troy live across the lake from each other. To get to the other person's house, they can take the bike path which is 3000 metres, they can take the jogging path which is 1500 metres, or they can swim 600 metres across the lake. James can run at the speed of 7.2 km/h, bike at 21.6 km/h and swim at 3.6 km/h. Troy can run at the speed of 9 km/h, bike at 18 km/h and swim at 5.4 km/h. The two guys decide to have a race from one house to the other and then back again.

    a. Which is the least time consuming path for each of them?
    b. Who would win the race and how much time would it take, assuming they each took the quickest route?

EXTENSIONS!

11. When the tap is turned on, a sink will fill at a uniform rate in 60 seconds. If the plug is removed, the sink will empty at a uniform rate in 80 seconds. How long will it take to fill the empty sink with the tap on and the plug removed?

12. At present, the sum of the ages of a father and his son is 33 years. Determine the smallest number of years until the father's age is 4 times the son's age.