

**Algebra CC**  
**Assignment #6**  
**Seeing Structure in Expressions**

1. Get a warm-up with the following. Evaluate each expression for the given value of  $x$ . Do these without the aid of a calculator to practice your mental arithmetic.

(a)  $3x - 8$  for  $x = 5$                       (b)  $5(x + 7) - 1$  for  $x = -3$                       (c)  $\frac{x-8}{4} + 5$  for  $x = 4$

2. If the expression  $x - 3$  has a value of  $-5$ , then which of the following represents the value of  $3x - 9$ ? Explain how you arrived at your choice.

(1)  $-2$               (2)  $-9$               (3)  $-15$               (4)  $-42$

3. The expression  $2x + 6$  is equal to 9 for some value of  $x$ . Without finding the value of  $x$ , determine the values for each of the following expressions. Show how you arrived at each answer.

(a)  $4x + 12$                       (b)  $2x + 9$                       (c)  $x + 3$   
(d)  $-6x - 18$                       (e)  $2x + 1$                       (f)  $10x + 32$

4. The expression  $x - 2$  has a value of  $-5$  for some value of  $x$ . For the same value of  $x$ , what is the value of the expression  $(x - 2)^2 + 5x - 10$ ? Show your reasoning for this problem.

5. The number of feet that Jennifer can run in a given time period  $t$  is given by the expression  $8t + 2$ . Her friend Erika can run a distance given by the expression  $4t + 3$ . Erika claims that she can only run half of what Jennifer can plus an additional 2 feet. Is she correct?

(a) Let's build up some evidence by playing around with various values of  $t$ . Fill out the following chart for both Jennifer and Erika's distances given the value of  $t$ .

Time, $t$	Jennifer's Distance $8t + 2$	Erika's Distance $4t + 3$	Is Erika Correct?
1			
3			
5			
10			

(b) The table provides good numerical evidence that what Erika says is true. Show by using mindful manipulations of the expression  $8t + 2$  that Erika's distance is always 2 feet more than half of Jennifer's.

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Which property (commutative, associative or distributive) is being used for each example?

R1.  $5x - 3 + 9x + 12 = 5x + 9x - 3 + 12$

R2.  $(4m - 9) + (3m + 2) = (4m + 3m) + (-9 + 2)$

R3.  $15r - 12t = 3(5r - 4t)$

R4. Evaluate  $a^2b+a$ , when  $a = -3$  and  $b = 2$

R5. Simplify:  $4x - 8x + 6x - 2x + 7x$

R6. Simplify:  $3q - 8 + 5q - 9$

R7. How many inches are in 3.25 feet?

R8. 270 minutes is equivalent to how many hours?

R9. Write .00024 in scientific notation

R10. Write the number  $2.34 \times 10^5$  in standard form.