

# Algebraic Equivalence

Name \_\_\_\_\_

**These problems should be completed on a separate sheet of paper.**

A. Find the solutions to the following equations (*Mathematics Vision Project – Mathematics 1 Lesson 1.1, page 5*)

1.  $6x = 18$

2.  $3x - 10 = 2$

3.  $8x - 10 = x + 11$

4.  $5x - 7 = 7x - 17$

5.  $3x + 9 = 44 - 2x$

6.  $3(x + 2) = x + 2$

B. Explain why the following equations have solution sets of all real numbers. Your explanation should use mathematical properties and language. (*EngageNY Lesson 11, Exercise 5*).

7.  $2x^2 + 4x = 2(x^2 + 2x)$

8.  $2x^2 + 4x = 4x + 2x^2$

9.  $2x^2 + 4x = 2x(2 + x)$

10.  $2x^2 + 4x = x(x + 4) + x^2$

C. Create an expression to go in the blank on the right of each equation such that the solution set for the equation will be all real numbers. DO NOT write the SAME expression as on the left side of the equation. (Note: There is more than one possible answer. Can you find multiple answers for each? Be creative!) (*EngageNY Lesson 11, Exercise 6*)

11.  $2x - 5 =$  \_\_\_\_\_

12.  $x^2 + x =$  \_\_\_\_\_

13.  $(x + 2)^2 =$  \_\_\_\_\_

(more on the back of this sheet)

D. Miscellaneous Questions (*EngageNY Lesson 12 Opening Exercises* plus others)

14. Why should the equations  $(x-1)(x+3) = 17+x$  and  $3(x-1)(x+3) = 51+3x$  have the same solution set?

15. Why should the equations  $(x-1)(x+3) = 17+x$  and  $(x-1)(x+3) + 500 = 517+x$  have the same solution set?

16. Is the expression  $x(4-x^2)$  algebraically equivalent to  $(-x^2+4)x$ ? Why or why not?

17. Does the equation  $\frac{2x}{x} = 2$  have all real numbers as its solution set? Explain.