

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Unit 6 - Lesson 5

### Conceptual Understanding (Tier 1)

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| <ol style="list-style-type: none"><li>1. Explain the concept of a monomial and provide evidence to support your explanation.</li><li>2. Explain the concept of a polynomial and provide evidence to support your explanation.</li><li>3. Explain the process for evaluating the following product using the standard algorithm and evaluate: <math>12(13)</math>.</li><li>4. How many individual products does it take to multiply <math>12(13)</math> using the standard algorithm? Write each of them below.</li></ol> | <ol style="list-style-type: none"><li>5. Evaluate the following product by applying the distributive property: <math>12(10 + 3)</math>. Is the product equivalent to the product you produced in problem #3? Why or why not?</li><li>6. Evaluate the following product by applying the distributive property: <math>(10 + 2)13</math>. Is the product equivalent to the product you produced in problem #3? Why or why not?</li><li>7. Evaluate the following expression by first applying the distributive property: <math>10(10 + 3) + 2(10 + 3)</math>. Is the product equivalent to the product you produced in problem #3? Why or why not?</li></ol> |
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8. When applying the distributive property, how many individual products did it take to evaluate  $10(10 + 3) + 2(10 + 3)$ ? Are they the same individual products as you listed in problem #4? Why or why not?
9. Could the expression  $10(10 + 3) + 2(10 + 3)$  be looked at as the sum of two terms? If so, are the terms like terms? *Explain.*
10. Is the expression  $10(10 + 3) + 2(10 + 3)$  equivalent to the expression  $(10 + 2)(10 + 3)$ ? Why or why not?
11. Explain how to evaluate the expression  $(10 + 2)(10 + 3)$  by applying the distributive property and provide evidence to support your explanation.
12. Could you have produced the same product by rewriting the expression  $12(13)$  as the expression  $(7 + 5)(7 + 6)$ ? Why or why not? *Include the distributive property in your justification.*
13. Could you have produced the same product by rewriting the expression  $12(13)$  as the expression  $(6 + 6)(9 + 4)$ ? Why or why not? *Include the distributive property in your justification.*
14. Could you have produced the same product by rewriting the expression  $12(13)$  as the expression  $(10 + 2)(15 - 2)$ ? Why or why not? *Include the distributive property in your justification.*
15. Could you have produced the same product by rewriting the expression  $12(13)$  as any expression  $(a + b)(c + d)$ ? Why or why not? *Include the distributive property in your justification.*

16. Following your responses to problems #3-11, what conjecture can you make about evaluating any product in the form  $(a + b)(c + d)$ ? Provide evidence to support your conjecture.

*Evaluate each of the following products two different ways:*

- 1. following the standard algorithm*
- 2. rewriting each factor as a sum of two numbers and applying the distributive property*

17. 11(14)

18. 15(15)

19. 13(17)

20. 18(12)

21. 19(11)

22. 14(16)

23. 21(19)

24. 21(24)

25. 21(29)

26. 17(49)

27. Looking back at problem #17-26, did your work support your conjecture from problem #16? *Explain and provide evidence to support your explanation.*

28. Could you have produced the same product by rewriting the expression  $12(13)$  as the expression  $(10+2)(10+2+1)$ ? Why or why not? *Include the distributive property in your justification.*

29. When applying the distributive property, how many individual products would it take to evaluate  $(10+2)(10+2+1)$ ? Write each of them below.

30. Could you have produced the same product by rewriting the expression  $12(13)$  as the expression  $(10+1+1)(10+2+1)$ ? Why or why not? *Include the distributive property in your justification.*

31. When applying the distributive property, how many individual products would it take to evaluate  $(10+1+1)(10+2+1)$ ? Write each of them below.

32. Could you have produced the same product by rewriting the expression  $12(13)$  as the expression  $(15-1-1-1)(15-2)$ ? Why or why not? *Include the distributive property in your justification.*

33. When applying the distributive property, how many individual products would it take to evaluate  $(15 - 1 - 1 - 1)(15 - 2)$ ? Write each of them below.
34. Following your responses to problems #28-33, what conjecture can you make about multiplying two sums or differences? *Provide evidence to support your conjecture.*
35. In the product  $(a + b)(c + d)$ , could  $a$ ,  $b$ ,  $c$ , and  $d$  represent any real number? Could they represent any variable? Could they represent any monomial? *Explain your responses and provide evidence to support your explanations.*
36. How is the expression  $(x + 2)(x + 3)$  different from the expression  $(10 + 2)(10 + 3)$ ?
37. Can you produce a numerical product for the expression  $(x + 2)(x + 3)$ ? Why or why not?
38. Could you follow the process you described in problem #16 to generate an expression involving only addition of monomials equivalent to the expression  $(x + 2)(x + 3)$ ? If so, generate the equivalent expression.
- Evaluate each product by applying the distributive property. Show each step of evaluating the product separately.*
39.  $(x + 5)(x + 4)$
40.  $(x + 2)(x + 7)$

41.  $(x+11)(x-3)$

42.  $(x-7)(x+4)$

43.  $(x-5)(x-4)$

44.  $(2x+5)(x+4)$

45.  $(2x+5)(3x+4)$

46.  $(-5x+1)(3x-7)$

47.  $\left(4x + \frac{1}{4}\right)\left(8x + \frac{3}{4}\right)$

48.  $(x+17)(x-17)$

49.  $(x-9)(x-9)$

50.  $(x^2+7)(x-13)$

51.  $(x^2-x)(-5x+11)$

52.  $(x+1)(x^2+x+1)$

53.  $(x+2)(x^2+3x+6)$

54.  $(x-4)(2x^2+8x-7)$

55.  $(x^2+x+1)(3x-8)$

56.  $(x^2-5)(3x^2-6x+9)$

57.  $(x^2-x+3)(x^2+x+2)$

58.  $(4x^2+3x+2)(5x^2-2x+3)$

**Procedural Skill and Fluency (Tier 2)**

*Simplify each of the following expressions.*

59.  $(a+7)(a+9)$

60.  $(a-7)(a+9)$

61.  $(a+7)(a-9)$

62.  $(a-7)(a-9)$

63.  $(a-8)(a+6)$

64.  $(a-8)(a-6)$

65.  $(a+8)(a-6)$

66.  $(a+8)(a+6)$

67.  $(2a-5)(4a+3)$

68.  $(2a+5)(4a-3)$

69.  $(2a+5)(4a+3)$

70.  $(2a-5)(4a-3)$

71.  $(a+4)(a^2+a+12)$

72.  $(a^2+4)(a^2+a+12)$

73.  $(a^2+4a)(a^2+a+12)$

74.  $(a^2+4a+1)(a^2+a+12)$

75.  $(a+b)(a+b)$

76.  $(2a+b)(a+2b)$

77.  $(2a + 3b)(3a + 2b)$

78.  $(a + b)(a + b + c)$

79.  $(a + b + c)(a + b)$

80.  $(a + b + c)(a + b + c)$