Name _____

Date _____

4.6 Binomial Squares and Other Special Products

1. Multiplying using the FOIL method: $(x-2)^2=(x-2)(x-2)=x^2-2x-2x+4=x^2-4x+4$

3. Multiplying using the FOIL method: $(a+3)^2=(a+3)(a+3)=a^2+3a+3a+9=a^2+6a+9$

5. Multiplying using the FOIL method: $(x-5)^2=(x-5)(x-5)=x^2-5x-5x+25=x^2-10x+25$

7. Multiplying using the FOIL method:

$$\left(a-\frac{1}{2}\right)^2=\left(a-\frac{1}{2}\right)\left(a-\frac{1}{2}\right)=a^2-\frac{1}{2}a-\frac{1}{2}a+\frac{1}{4}=a^2-a+\frac{1}{4}$$

9. Multiplying using the FOIL method:

$$(x+10)^2=(x+10)(x+10)=x^2+10x+10x+100=x^2+20x+100$$

11. Multiplying using the square of binomial formula:

$$(a+0.8)^2=a^2+2(a)(0.8)+(0.8)^2=a^2+1.6a+0.64$$

13. Multiplying using the square of binomial formula:

$$(2x-1)^2=(2x)^2-2(2x)(1)+(1)^2=4x^2-4x+1$$

15. Multiplying using the square of binomial formula:

$$(4a+5)^2=(4a)^2+2(4a)(5)+(5)^2=16a^2+40a+25$$

17. Multiplying using the square of binomial formula:

$$(3x-2)^2=(3x)^2-2(3x)(2)+(2)^2=9x^2-12x+4$$

19. Multiplying using the square of binomial formula:

$$(3a+5b)^2=(3a)^2+2(3a)(5b)+(5b)^2=9a^2+30ab+25b^2$$

21. Multiplying using the square of binomial formula:

$$(4x-5y)^2=(4x)^2-2(4x)(5y)+(5y)^2=16x^2-40xy+25y^2$$

23. Multiplying using the square of binomial formula:

$$(7m+2n)^2=(7m)^2+2(7m)(2n)+(2n)^2=49m^2+28mn+4n^2$$

25. Multiplying using the square of binomial formula:

$$(6x-10y)^2=(6x)^2-2(6x)(10y)+(10y)^2=36x^2-120xy+100y^2$$

27. Multiplying using the square of binomial formula:

$$\left(x^2+5\right)^2=\left(x^2\right)^2+2\left(x^2\right)(5)+(5)^2=x^4+10x^2+25$$

29. Multiplying using the square of binomial formula:

$$\left(a^2+1\right)^2=\left(a^2\right)^2+2\left(a^2\right)(1)+(1)^2=a^4+2a^2+1$$

31. Completing the table:

x	$(x+3)^2$	x^2+9	x^2+6x+9
1	16	10	16
2	25	13	25
3	36	18	36
4	49	25	49

33. Completing the table:

a	1	3	3	4
b	1	5	4	5
$(a+b)^2$	4	64	49	81
a^2+b^2	2	34	25	41
a^2+ab+b^2	3	49	37	61
$a^2+2ab+b^2$	4	64	49	81

35. Multiplying using the FOIL method: $(a+5)(a-5)=a^2+5a-5a-25=a^2-25$

37. Multiplying using the FOIL method: $(y-1)(y+1)=y^2-y+y-1=y^2-1$

39. Multiplying using the difference of squares formula: $(9+x)(9-x)=(9)^2-(x)^2=81-x^2$

41. Multiplying using the difference of squares formula: $(2x+5)(2x-5)=(2x)^2-(5)^2=4x^2-25$

43. Multiplying using the difference of squares formula:

$$\left(4x+\frac{1}{3}\right)\left(4x-\frac{1}{3}\right)=(4x)^2-\left(\frac{1}{3}\right)^2=16x^2-\frac{1}{9}$$

45. Multiplying using the difference of squares formula:

$$(2a+7)(2a-7)=(2a)^2-(7)^2=4a^2-49$$

47. Multiplying using the difference of squares formula: $(6-7x)(6+7x)=(6)^2-(7x)^2=36-49x^2$

49. Multiplying using the difference of squares formula: $(x^2+3)(x^2-3)=(x^2)^2-(3)^2=x^4-9$

51. Multiplying using the difference of squares formula: $(a^2+4)(a^2-4)=(a^2)^2-(4)^2=a^4-16$

53. Multiplying using the difference of squares formula:

$$(5y^4-8)(5y^4+8)=(5y^4)^2-(8)^2=25y^8-64$$

55. Multiplying and simplifying: $(x+3)(x-3)+(x+5)(x-5)=(x^2-9)+(x^2-25)=2x^2-34$

57. Multiplying and simplifying:

$$\begin{aligned}(2x+3)^2-(4x-1)^2&=(4x^2+12x+9)-(16x^2-8x+1)\\&=4x^2+12x+9-16x^2+8x-1\\&=-12x^2+20x+8\end{aligned}$$

59. Multiplying and simplifying:

$$(a+1)^2-(a+2)^2+(a+3)^2=(a^2+2a+1)-(a^2+4a+4)+(a^2+6a+9)$$
$$=a^2+2a+1-a^2-4a-4+a^2+6a+9$$
$$=a^2+4a+6$$

61. Multiplying and simplifying:

$$(2x+3)^3=(2x+3)(2x+3)^2$$
$$=(2x+3)(4x^2+12x+9)$$
$$=8x^3+24x^2+18x+12x^2+36x+27$$
$$=8x^3+36x^2+54x+27$$

63. Finding the product: $49(51)=(50-1)(50+1)=(50)^2-(1)^2=2,500-1=2,499$

65. Evaluating when $x=2$:

$$(x+3)^2=(2+3)^2=(5)^2=25$$

$$x^2+6x+9=(2)^2+6(2)+9=4+12+9=25$$

67. Let x and $x+1$ represent the two integers. The expression can be written as:

$$(x)^2+(x+1)^2=x^2+(x^2+2x+1)=2x^2+2x+1$$

69. Let x, $x+1$, and $x+2$ represent the three integers. The expression can be written as:

$$(x)^2+(x+1)^2+(x+2)^2=x^2+(x^2+2x+1)+(x^2+4x+4)=3x^2+6x+5$$

71. Verifying the areas: $(a+b)^2=a^2+ab+ab+b^2=a^2+2ab+b^2$

73. Simplifying: $\dfrac{10x^3}{5x}=2x^{3-1}=2x^2$

75. Simplifying: $\dfrac{3x^2}{3}=x^2$

77. Simplifying: $\dfrac{9x^2}{3x}=3x^{2-1}=3x$

79. Simplifying: $\dfrac{24x^3y^2}{8x^2y}=3x^{3-2}y^{2-1}=3xy$