Lesson 8

READY, SET, GO! Name Period Date

READY

Topic: Multiplying Binomials Using a Two-Way Table

Multiply the following binomials using the given two-way table to assist you.

Example: (2x + 3)(5x – 7)

(2x + 3) \ (5x – 7)	
$10x^2$	- 14x
+15x	- 21

$= 10x^2 + x - 21$

1. (3x – 4)(7x – 5)

$21x^2$	-15x
-28x	+20

$21x^2 - 43x + 20$

2. (9x + 2)(x + 6)

$9x^2$	+15x
+2x	+12

$9x^2 + 17x + 12$

3. (4x – 3)(3x + 11)

$12x^2$	+44x
-9x	-33

$12x^2 + 36x - 33$

4. (7x + 3)(7x – 3)

$49x^2$	-21x
+21x	-9

$49x^2 - 9$

5. (3x – 10)(3x + 10)

$9x^2$	+30x
-30x	-100

$9x^2 - 100$

6. (11x + 5)(11x – 5)

$121x^2$	-55x
+55x	-25

$121x^2 - 25$

7. $(4x + 5)^2$

$(4x+5)(4x+5)$

$16x^2$	+20x
+20x	+25

8. $(x + 9)^2$

$(x+9)(x+9)$

x^2	+9x
+9x	+81

$x^2 + 18x + 81$

9. $(10x - 7)^2$

$(10x-7)(10x-7)$

$100x^2$	-70x
-70x	+49

$100x^2 - 140x + 49$

10. The "like-term" boxes in #'s 7, 8, and 9 reveal a special pattern. Describe the relationship between the middle coefficient ***(b)*** and the coefficients ***(a)*** and ***(c).***

$b = 2ac$

SET

Topic: Factored Form of a Quadratic Function

Given the *factored form* of a quadratic function, identify the vertex, intercepts, and vertical stretch of the parabola.

11. $y = 4(x-2)(x+6)$

a. Vertex: (-2, -64)
b. *x*-inter(s) (2,0)(-6,0)
c. *y*-inter (0, -48)
d. Stretch Vertical by 4

x=0 4 · -2 · 6
Vertex $x = \frac{2+-6}{2} = \frac{-4}{2} = -2$
$f(-2) = 4 \cdot -4 \cdot 4 = -64$

12. $y = -3(x+2)(x-6)$

a. Vertex: (2, 48)
b. *x*-inter(s) (-2,0)(6,0)
c. *y*-inter: (0, 36)
d. Stretch Vertical by 3

x=0 (-3 · 2 · -6 Reflect over x-axis
Vertex $x = \frac{-2+6}{2} = \frac{4}{2} = 2$
$f(2) = -3 \cdot 4 \cdot -4 = 48$

13. $y = (x+5)(x+7)$

a. Vertex: (-6, -1)
b. *x*-inter(s) (-5,0)(-7,0)
c. *y*-inter (0, 35)
d. Stretch none

f(0) = 5 · 7
$x = \frac{-5+-7}{2} = -6$
$f(-6) = -1 \cdot 1 = -1$

14. $y = \frac{1}{2}(x-7)(x-7)$

a. Vertex: (7, 0)
b. *x*-inter(s) (7,0) ← Double root
c. *y*-inter (0, 24.5)
d. ~~Stretch~~ Shrink Vertical by $\frac{1}{2}$

$f(7) = \frac{1}{2}(0)(0)$
$f(0) = \frac{1}{2}(-7)(-7)$

15. $y = -\frac{1}{2}(x-8)(x+4)$

a. Vertex: (2, 18)
b. *x*-inter(s) (8,0)(-4,0)
c. *y*-inter: (0, 16)
d. ~~Stretch~~ shrink vertical by $\frac{1}{2}$

$f(2) = -\frac{1}{2}(-6)(6) = 18$
$f(0) = -\frac{1}{2}(-8)(4) = 16$

16. $y = \frac{3}{5}(x-25)(x-9)$

a. Vertex: (19, -36)
b. *x*-inter(s) (29, 0)(9,0)
c. *y*-inter (0, 135)
d. Stretch Vertical Shrink by $\frac{3}{5}$

$h = \frac{29+9}{2}$
$f(19) = \frac{3}{5}(-6)(10) = \frac{3}{5}(-60) = -36$
$f(0) = \frac{3}{5}(-25)(-9) = 135$

17. $y = \frac{3}{4}(x-3)(x+3)$

a. Vertex: $(0, -\frac{27}{4})$
b. *x*-inter(s) (3,0)(-3,0)
c. *y*-inter $(0, -\frac{27}{4})$
d. ~~Stretch~~ Shrink vertical by $\frac{3}{4}$

$f(0) = \frac{3}{4}(-3)(3)$
$= \frac{-27}{4}$

18. $y = -(x-5)(x+5)$

a. Vertex: (0, 25)
b. *x*-inter(s) (5,0)(-5,0)
c. *y*-inter: (0, 25)
d. Stretch NONE

$f(0) = -1(-5)(5) = 25$

19. $y = \frac{2}{3}(x+10)(x+10)$

a. Vertex: (-10, 0)
b. *x*-inter(s) (-10,0) ← Double root
c. *y*-inter $(0, \frac{200}{3})$
d. ~~Stretch~~ Vertical shrink by $\frac{2}{3}$

$f(0) = \frac{2}{3}(10)(10) = \frac{200}{3}$

GO

Topic: Vertex Form of a Quadratic Equation

Given the *vertex form* of a quadratic function, identify the vertex, intercepts, and vertical stretch of the parabola.

20. $y = (x+2)^2 - 4$

a. Vertex: (-2, -4)

b. x-inter(s) (-6, 0) (2, 0)

c. y-inter (0, 0)

d. Stretch N/A

21. $y = -3(x+6)^2 + 3$

a. Vertex: (-6, 3)

b. x-inter(s) (-7, 0) & (-5, 0)

c. y-inter: (0, -105)

d. Stretch Vertical stretch by 3

22. $y = 2(x-1)^2 - 8$

a. Vertex: (1, -8)

b. x-inter(s) (3, 0) (-1, 0)

c. y-inter (0, -6)

d. Stretch Vertical stretch by 2

23. $y = 4(x+2)^2 - 64$

a. Vertex: (-2, -64)

b. x-inter(s) (2, 0) (-6, 0)

c. y-inter (0, -48)

d. Stretch Vertical stretch by 4

24. $y = -3(x-2)^2 + 48$

a. Vertex: (2, 48)

b. x-inter(s) (6, 0) (-2, 0)

c. y-inter: (0, 36)

d. Stretch Vertical stretch by 3

25. $y = (x+6)^2 - 1$

a. Vertex: (-6, -1)

b. x-inter(s) (-5, 0) (-7, 0)

c. y-inter (0, 35)

d. Stretch N/A

26. Did you notice that the parabolas in problems 11, 12, & 13 are the same as the ones in problems 23, 24, & 25 respectively? If you didn't, go back and compare the answers in problems 11, 12, & 13 and problems 23, 24, & 25.

Prove that a. $4(x-2)(x+6) = 4(x+2)^2 - 64$

b. $-3(x+2)(x-6) = -3(x-2)^2 + 48$

c. $(x+5)(x+7) = (x+6)^2 - 1$