

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: $(2x + 3)(5x - 7)$

	$(5x - 7)$	
$(2x + 3)$	$10x^2$	$-14x$
	$+15x$	-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. $y = 4(x - 2)(x + 6)$ $x = 0 \quad 4 \cdot -2 \cdot 6$
 a. Vertex: $(-2, -48)$
 b. x-inter(s) $(2, 0)(-6, 0)$
 c. y-inter $(0, -48)$
 d. Stretch Vertical by 4
 vertex $x = \frac{2 + -6}{2} = \frac{-4}{2} = -2$
 $f(-2) = 4 \cdot -4 \cdot 4 = -64$
12. $y = -3(x + 2)(x - 6)$ $x = 0 \quad -3 \cdot 2 \cdot -6$ *Reflect over x-axis*
 a. Vertex: $(2, 48)$
 b. x-inter(s) $(-2, 0)(6, 0)$
 c. y-inter: $(0, 36)$
 d. Stretch Vertical by 3
 vertex $x = \frac{-2 + 6}{2} = \frac{4}{2} = 2$
 $f(2) = -3 \cdot 4 \cdot -4 = 48$
13. $y = (x + 5)(x + 7)$ $f(0) = 5 \cdot 7$
 a. Vertex: $(-6, -1)$
 b. x-inter(s) $(-5, 0)(-7, 0)$
 c. y-inter $(0, 35)$
 d. Stretch none
 $x = \frac{-5 + -7}{2} = -6$
 $f(-6) = -1 \cdot -1 = -1$
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 $\frac{1}{2}$
 $f(2) = -\frac{1}{2}(-6)(4) = 12$
 $f(0) = -\frac{1}{2}(-8)(4) = 16$
16. $y = \frac{3}{5}(x - 25)(x - 9)$
 a. Vertex: $(19, -36)$ $h = \frac{29 + 9}{2}$
 b. x-inter(s) $(29, 0)(9, 0)$
 c. y-inter $(0, 135)$
 d. Stretch Vertical Shrink by $\frac{3}{5}$
 $f(19) = \frac{3}{5}(-6)(10) = \frac{3}{5}(-60) = -36$
 $f(0) = \frac{3}{5}(-25)(-9) = 135$
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 $\frac{2}{3}$
 $f(0) = \frac{2}{3}(10)(10) = \frac{200}{3}$

Need help? Visit www.rsgsupport.org

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.

$$\begin{aligned} 0 &= -3(x+6)^2 + 3 \\ -3 &= -3(x+6)^2 \\ \sqrt{1} &= \sqrt{(x+6)^2} \\ \pm 1 &= x+6 \end{aligned} \quad \begin{aligned} -1 &= x+6 & 1 &= x+6 \\ -7 &= x & -5 &= x \end{aligned}$$

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

$$\begin{aligned} -2 &= x+4 \\ -6 &= x \\ 2 &= x+4 \\ -2 &= x \end{aligned} \quad \begin{aligned} 0 &= (x+4)^2 - 4 \\ \sqrt{4} &= \sqrt{(x+4)^2} \\ \pm 2 &= x+4 \end{aligned}$$

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

a. Vertex: $(-2, -64)$

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

c. y-inter $(0, -48)$

d. Stretch Vertical stretch by 4

$$\begin{aligned} 0 &= 4(x+2)^2 - 64 \\ 64 &= 4(x+2)^2 \\ \sqrt{16} &= \sqrt{(x+2)^2} \\ \pm 4 &= x+2 \\ 4 &= x+2 & -4 &= x+2 \\ 2 &= x & -2 &= x \end{aligned}$$

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

$$\begin{aligned} 0 &= 2(x-1)^2 - 8 \\ 8 &= 2(x-1)^2 \\ \sqrt{4} &= \sqrt{(x-1)^2} \\ \pm 2 &= x-1 \\ 2 &= x-1 & -2 &= x-1 \\ 3 &= x & -1 &= x \end{aligned}$$

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

$$\begin{aligned} 0 &= -3(x-2)^2 + 48 \\ -48 &= -3(x-2)^2 \\ \sqrt{16} &= \sqrt{(x-2)^2} \\ \pm 4 &= x-2 \\ 4 &= x-2 & -4 &= x-2 \\ 6 &= x & -2 &= x \end{aligned}$$

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

$$\begin{aligned} 0 &= (x+6)^2 - 1 \\ \sqrt{1} &= \sqrt{(x+6)^2} \\ \pm 1 &= x+6 \\ 1 &= x+6 & -1 &= x+6 \\ -5 &= x & -7 &= x \end{aligned}$$

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. Factored $4(x - 2)(x + 6) = 4(x + 2)^2 - 64$

$$\begin{aligned} &4(x^2 + 4x - 12) \\ \text{Standard} &4x^2 + 16x - 48 \\ &(4x^2 + 16x + 4) - 48 - 4 \\ &4(x^2 + 4x + 4) - 64 \\ &4(x+2)^2 - 64 \end{aligned}$$

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

$$\begin{aligned} &-3(x^2 - 4x - 12) \\ \text{Standard} &-3x^2 + 12x + 36 \\ &(-3x^2 + 12x - 12) + 36 + 12 \\ &-3(x^2 - 4x + 4) + 48 \\ \text{Vertex} &-3(x-2)^2 + 48 \end{aligned}$$

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

$$\begin{aligned} \text{Standard} &x^2 + 12x + 35 \\ &(x^2 + 12x + 36) + 35 - 36 \\ \text{Vertex Form} &(x+6)^2 - 1 \end{aligned}$$

Need help? Visit www.rsgsupport.org