5-Minute Check

Over Lesson 8–6

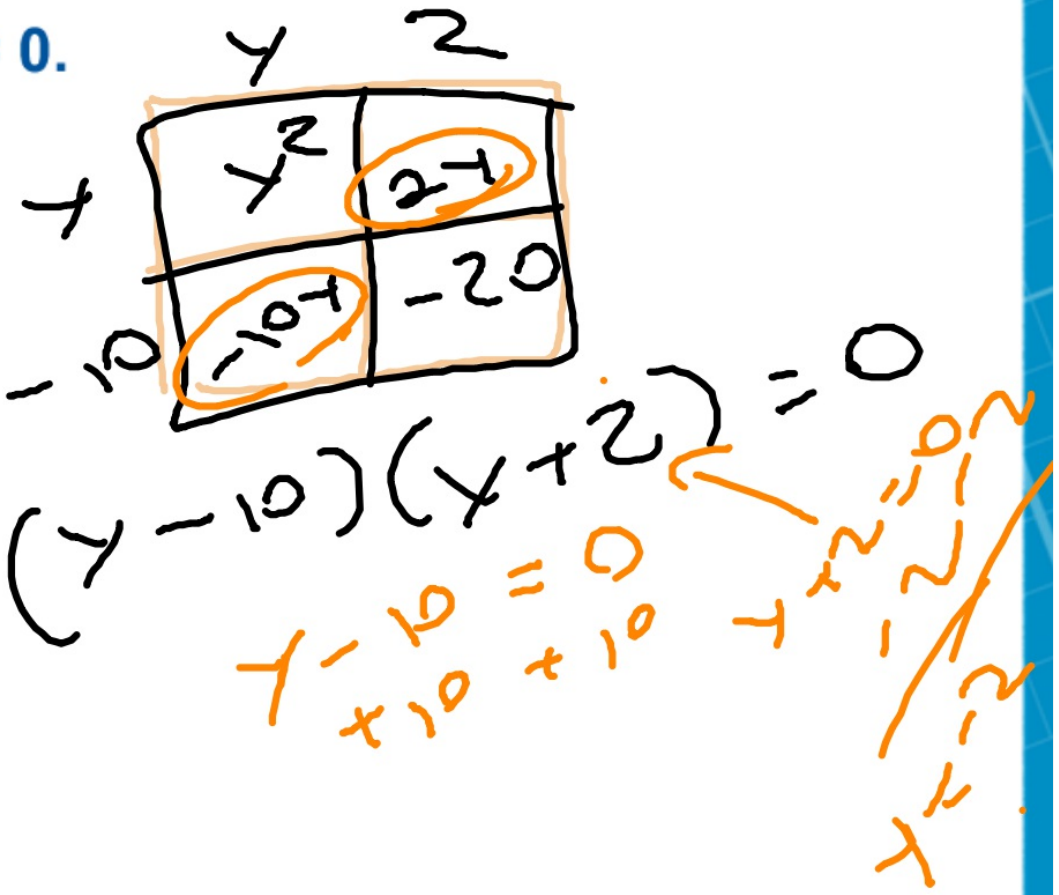
3 Solve $y^2 - 8y - 20 = 0$.

A. {–4, 3}

B. {3, 6}

C. {–2, 10}

D. {1, 8}



5-Minute Check Over Lesson 8–6

3 Solve $y^2 - 8y - 20 = 0$.

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LESSON 8–7 Solving $ax^2 + bx + c = 0$

KeyConcept Factoring $ax^2 + bx + c$

Words To factor trinomials of the form $ax^2 + bx + c$, find two integers, m and p, with a sum of b and a product of ac. Then write $ax^2 + bx + c$ as $ax^2 + mx + px + c$, and factor by grouping.

Example

$$5x^2 - 13x + 6 = 5x^2 - 10x - 3x + 6 \qquad m = -10 \text{ and } p = -3$$

$$= 5x(x - 2) + (-3)(x - 2)$$

$$= (5x - 3)(x - 2)$$

This works, but let's try another way...

Challenge: how do we do this?

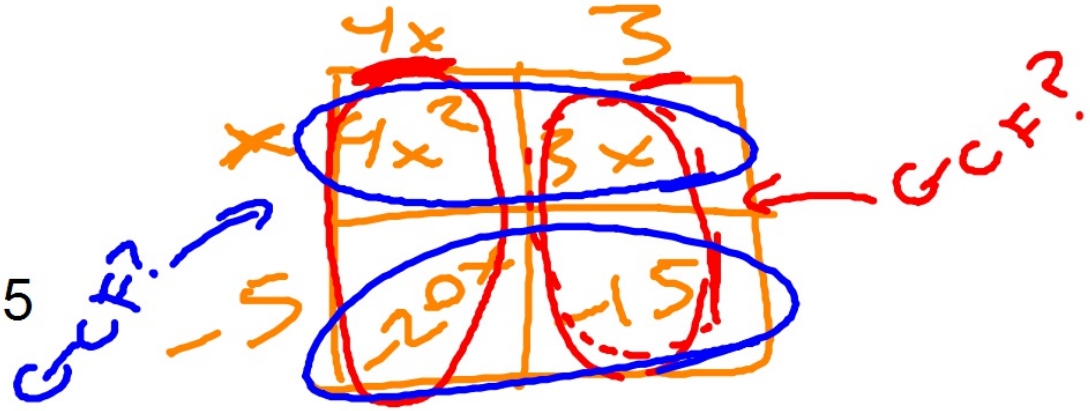
Let's try using the diamond (or x factor) method to approach this, BUT a little bit different....

$(4x + 3)(x - 5)$

$4x^2 - 20x + 3x - 15$

$4x^2 - 17x - 15$

first, let's multiply together....



...wouldn't it be nice to use the box method in reverse?

remember, to factor, we need to do all of this *in reverse.*

$(4x + 3)(x - 5)$

$4x^2 - 20x + 3x - 15$

$4x^2 - 17x - 15$

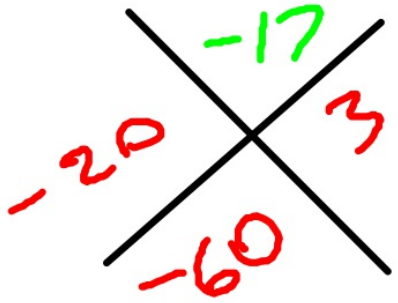
$4x^2 - 17x - 15$

"what two numbers multiply to -60 and adds up to -17?"

NOW, let's try to factor...

1)Put the middle number on top.

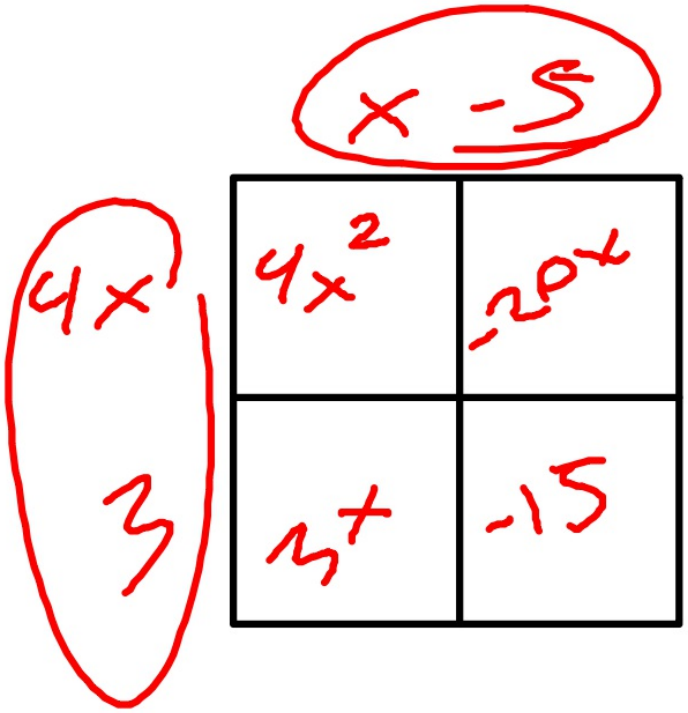
2) Put the PRODUCT o the first and last number on the bottom.



$(4x + 3)(x - 5)$

$4x^2 - 20x + 3x - 15$

$4x^2 - 17x - 15$



NOW, let's use the box method in reverse!

1) Put the first and last terms diagonal to each other.

2) put the middle terms in the other two boxes.

3) look across the rows and columns to factor appropriately!

Check Your Understanding

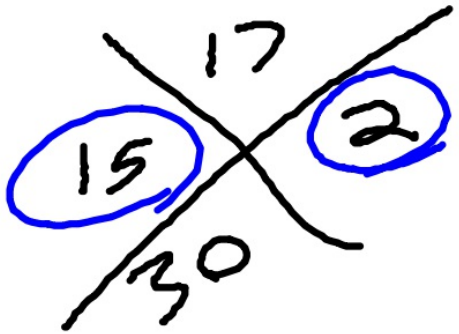
= [redacted] ...ns begin on page R13.

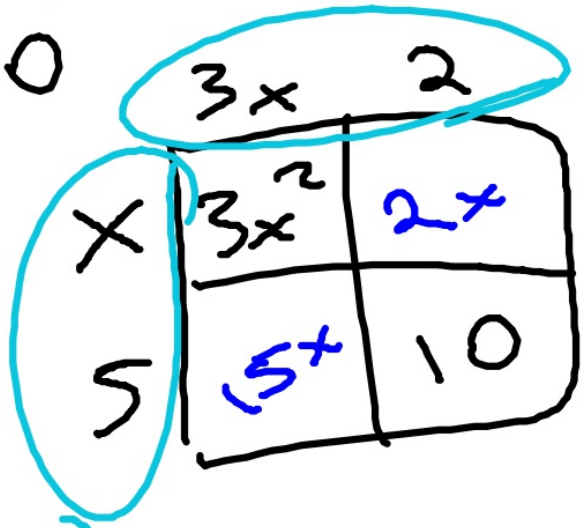
Examples 1–3 Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

1. $3x^2 + 17x + 10$ $(3x + 2)(x + 5)$
2. $2x^2 + 22x + 56$ $2(x + 4)(x + 7)$
3. $5x^2 - 3x + 4$ [redacted]
4. $3x^2 - 11x - 20$ $(3x + 4)(x - 5)$

Check out the answer to number 2...they took out the GCF first!

(1) $3x^2 + 17x + 10$





$(3x^2 + 15x) + (2x + 10)$

$3x(x+5) + 2(x+5)$

Check Your Understanding

= Step-by-Step Solutions begin on page R13.

Examples 1–3 Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

1. $3x^2 + 17x + 10$ $(3x + 2)(x + 5)$
2. $2x^2 + 22x + 56$ $2(x + 4)(x + 7)$
3. $5x^2 - 3x + 4$ prime
4. $3x^2 - 11x - 20$ $(3x + 4)(x - 5)$

(2) $2(x^2 + 11x + 28)$

$2(x + 4)(x + 7)$

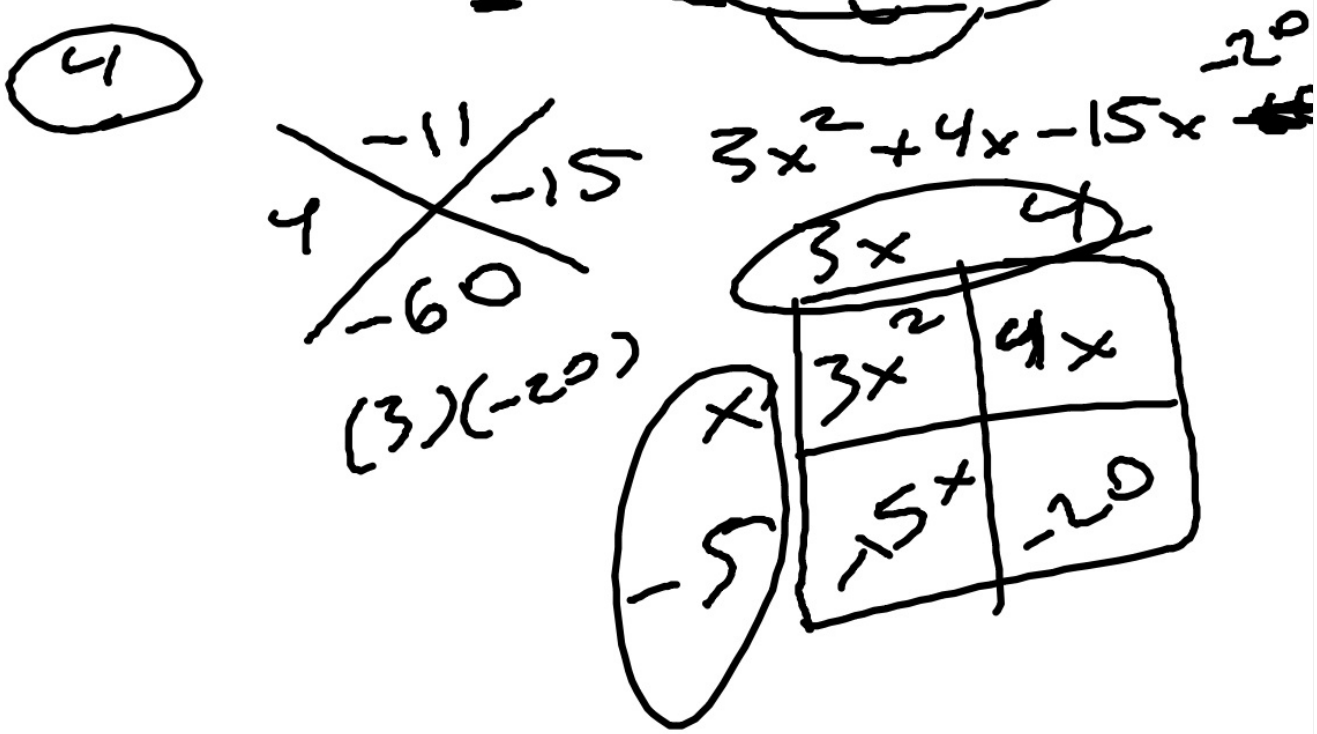
	x	4
x	x^2	$4x$
7	$7x$	28

Check Your Understanding

= Step-by-Step Solutions begin on page R13.

Examples 1–3 Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

1. $3x^2 + 17x + 10$ **$(3x + 2)(x + 5)$**
2. $2x^2 + 22x + 56$ **$2(x + 4)(x + 7)$**
3. $5x^2 - 3x + 4$ **prime**
4. $3x^2 - 11x - 20$ **$(3x + 4)(x - 5)$**



Example 4 **Solve each equation. Confirm your answers using a graphing calculator.**

5. $2x^2 + 9x + 9 = 0$ $-\frac{3}{2}, -3$

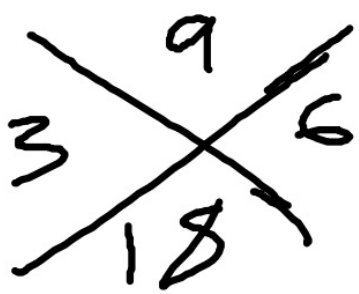
6. $3x^2 + 17x + 20 = 0$ $-\frac{5}{3}, -4$

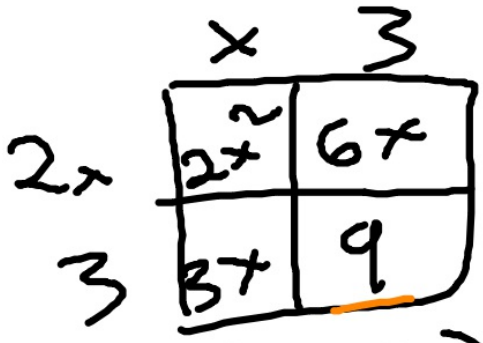
7. $3x^2 - 10x + 8 = 0$ $\frac{4}{3}, 2$

8. $2x^2 - 17x + 30 = 0$ $\frac{5}{2}, 6$

(5)

1) factor





$(2x+3)(x+3) = 0$

2) zero product property!

$2x+3=0$
$-3\ -3$
$2x = -3$
$\frac{2x}{2} = \frac{-3}{2}$
$x = -\frac{3}{2}$

$x+3=0$
$-3\ -3$
$x = -3$

11. $(2x+3)(x+8)$ 13. $2(2x+5)(x+7)$

Practice and Problem Solving

Extra Practice is on page R8.

Examples 1–3 Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

10. $5x^2 + 34x + 24$
11. $2x^2 + 19x + 24$
12. $4x^2 + 22x + 10$ $2(2x+1)(x+5)$
13. $4x^2 + 38x + 70$
14. $2x^2 - 3x - 9$
15. $4x^2 - 13x + 10$ $(4x-5)(x-2)$
16. $2x^2 + 3x + 6$ prime
17. $5x^2 + 3x + 4$ prime
18. $12x^2 + 69x + 45$ $3(4x+3)(x+5)$
19. $4x^2 - 5x + 7$ prime
20. $5x^2 + 23x + 24$ $(5x+8)(x+3)$
21. $3x^2 - 8x + 15$ prime

13

$2(2x^2 + 19x + 35)$

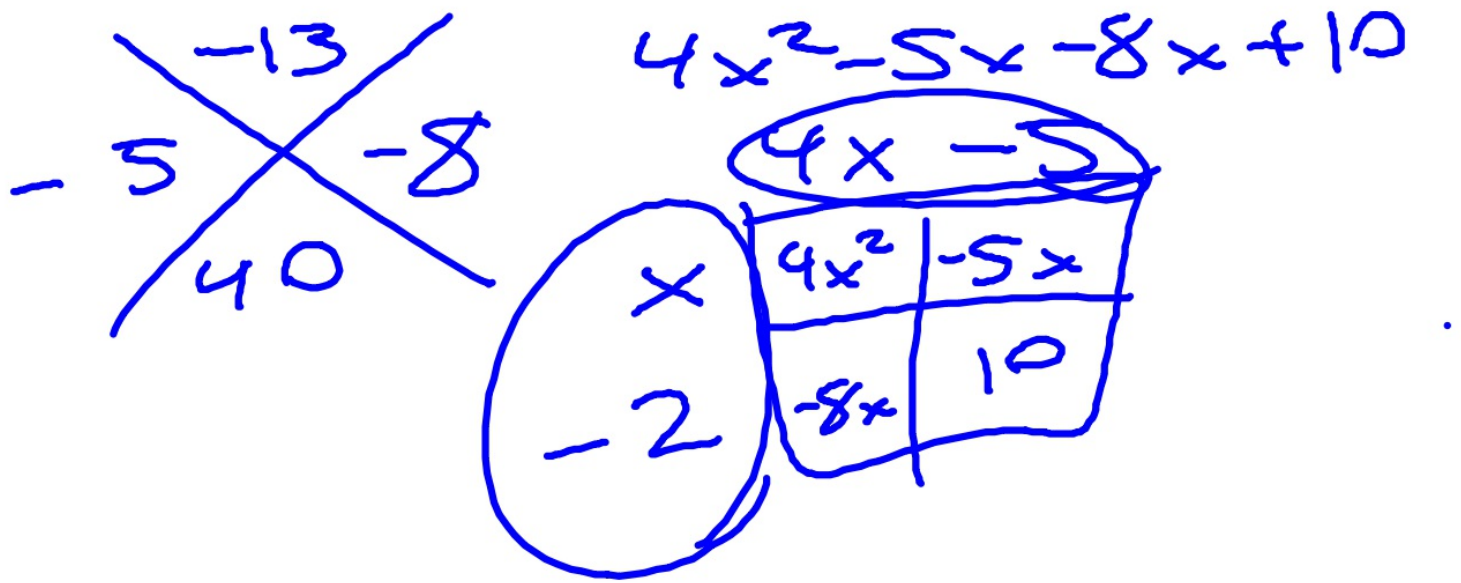
$2x^2 + 5x + 14x + 70$

19, 14, 5, 70

$2(2x+5)(x+7)$

	$2x$	5
x	$2x^2$	$5x$
7	$14x$	35

15. $4x^2 - 13x + 10$ **$(4x-5)(x-2)$**



Solve each equation. Confirm your answers using a graphing calculator.

23. $2x^2 + 9x - 18 = 0$ $\frac{3}{2}, -6$

24. $4x^2 + 17x + 15 = 0$ $-\frac{5}{4}, -3$

25. $-3x^2 + 26x = 16$ $\frac{2}{3}, 8$

26. $-2x^2 + 13x = 15$ $\frac{3}{2}, 5$

27. $-3x^2 + 5x = -2$ $-\frac{1}{3}, 2$

28. $-4x^2 + 19x = -30$ $-\frac{5}{4}, 6$