Lesson Check

Do you know HOW?

Factor each expression. Check your answer.

1. $x^2 + 7x + 12$
2. $r^2 - 13r + 42$
3. $p^2 + 3p - 40$
4. $a^2 + 12ab + 32b^2$
5. The area of a rectangle is given by the trinomial $n^2 - 3n - 28$. What are the possible dimensions of the rectangle? Use factoring.

Do you UNDERSTAND? MATHEMATICAL PRACTICES

Tell whether the sum of the factors of the constant term should be *positive* or *negative* when you factor the trinomial.

6. $s^2 + s - 30$
7. $w^2 + 11w + 18$
8. $x^2 - x - 20$
9. **Reasoning** Under what circumstances should you look at pairs of negative factors of the constant term when factoring a trinomial of the form $x^2 + bx + c$?

Practice and Problem-Solving Exercises MATHEMATICAL PRACTICES

A Practice

Complete. See Problems 1 and 2.

10. $k^2 + 5k + 6 = (k + 2)(k + ■)$
11. $x^2 - 7x + 10 = (x - 5)(x - ■)$
12. $t^2 - 10t + 24 = (t - 4)(t - ■)$
13. $v^2 + 12v + 20 = (v + 10)(v + ■)$

Factor each expression. Check your answer.

14. $y^2 + 6y + 5$
15. $t^2 + 10t + 16$
16. $x^2 + 15x + 56$
17. $n^2 - 15n + 56$
18. $r^2 - 11r + 24$
19. $q^2 - 8q + 12$

Complete. See Problem 3.

20. $q^2 + 3q - 54 = (q - 6)(q + ■)$
21. $z^2 - 2z - 48 = (z - 8)(z + ■)$
22. $n^2 - 5n - 50 = (n + 5)(n - ■)$
23. $y^2 + 8y - 9 = (y + 9)(y - ■)$

Factor each expression. Check your answer.

24. $r^2 + 6r - 27$
25. $w^2 - 7w - 8$
26. $z^2 + 2z - 8$
27. $x^2 + 5x - 6$
28. $v^2 + 5v - 36$
29. $n^2 - 3n - 10$

STEM 30. **Carpentry** The area of a rectangular desk is given by the trinomial $d^2 - 7d - 18$. What are the possible dimensions of the desk? Use factoring. See Problem 4.

31. **Design** The area of a rectangular rug is given by the trinomial $r^2 - 3r - 4$. What are the possible dimensions of the rug? Use factoring.

Choose the correct factored form for each expression. See Problem 5.

32. $k^2 + 5kn - 84n^2$ **A.** $(k - 7n)(k - 12n)$ **B.** $(k - 7n)(k + 12n)$

33. $p^2 - 8pq - 33q^2$ **A.** $(p + 3q)(p - 11q)$ **B.** $(p - 3q)(p + 11q)$

34. $x^2 - 16xy + 48y^2$ **A.** $(x - 4y)(x + 12y)$ **B.** $(x - 4y)(x - 12y)$

Factor each expression.

35. $r^2 + 19rs + 90s^2$ **36.** $g^2 - 12gh + 35h^2$ **37.** $m^2 - 3mn - 28n^2$

38. $x^2 + 3xy - 18y^2$ **39.** $w^2 - 14wz + 40z^2$ **40.** $p^2 + 11pq + 24q^2$

B Apply

41. Writing Suppose you can factor $x^2 + bx + c$ as $(x + p)(x + q)$.

a. Explain what you know about p and q when $c > 0$.

b. Explain what you know about p and q when $c < 0$.

42. Error Analysis Describe and correct the error made in factoring the trinomial.

$$\cancel{x^2 - 10x - 24 = (x - 6)(x - 4)}$$

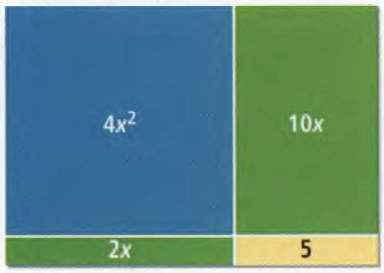
43. Think About a Plan The area of a parallelogram is given by the trinomial $x^2 - 14x + 24$. The base of the parallelogram is $x - 2$. What is an expression for the height of the parallelogram?

- What is the formula for the area of a parallelogram?
- How can you tell whether the binomial that represents the height has a positive or negative constant term?

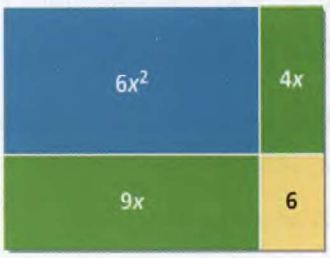
44. Recreation A rectangular skateboard park has an area of $x^2 + 15x + 54$. What are the possible dimensions of the park? Use factoring.

Write the standard form of each polynomial modeled below. Then factor each expression.

45.



46.



47. Reasoning Let $x^2 - 13x - 30 = (x + p)(x + q)$.

a. What do you know about the signs of p and q?

b. Suppose $|p| > |q|$. Which number, p or q, is a negative integer? Explain.

48. Reasoning Let $x^2 + 13x - 30 = (x + p)(x + q)$.

a. What do you know about the signs of p and q?

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