Name _____ Class _____ Date _____

Practice

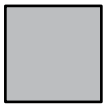
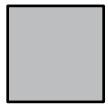
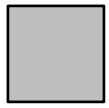
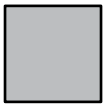
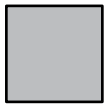
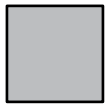
Form G

Factoring Special Cases

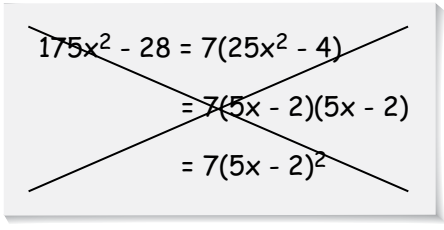
Factor each expression.

1. $h^2 + 10h + 25$
   $(h + 5)^2$
2. $v^2 - 14v + 49$
   $(v - 7)^2$
3. $d^2 - 22d + 121$
   $(d - 11)^2$
4. $m^2 + 4m + 4$
   $(m + 2)^2$
5. $q^2 + 6q + 9$
   $(q + 3)^2$
6. $p^2 - 24p + 144$
   $(p - 12)^2$
7. $36x^2 + 60x + 25$
   $(6x + 5)^2$
8. $64x^2 + 48x + 9$
   $(8x + 3)^2$
9. $49n^2 + 14n + 1$
   $(7n + 1)^2$
10. $16s^2 - 72s + 81$
    $(4s - 9)^2$
11. $25r^2 - 80r + 64$
    $(5r - 8)^2$
12. $9g^2 - 24g + 16$
    $(3g - 4)^2$
13. $81w^2 + 144w + 64$
    $(9w + 8)^2$
14. $16e^2 - 88e + 121$
    $(4e - 11)^2$
15. $25j^2 + 100j + 100$
    $(5j + 10)^2$
16. $144f^2 - 24f + 1$
    $(12f - 1)^2$
17. $4a^2 - 36a + 81$
    $(2a - 9)^2$
18. $49d^2 - 84d + 36$
    $(7d - 6)^2$

The given expression represents the area. Find the side length of the square.

19. 
    $64x^2 + 80x + 25$
    $8x + 5$
20. 
    $9y^2 - 24y + 16$
    $3y - 4$
21. 
    $4t^2 + 36t + 81$
    $2t + 9$
22. 
    $36n^2 + 84n + 49$
    $6n + 7$
23. 
    $100w^2 + 20w + 1$
    $10w + 1$
24. 
    $16s^2 + 104s + 169$
    $4s + 13$

25. **Error Analysis** Describe and correct the error made in factoring the expression at the right.
    $(25x^2 - 4)$ factors to $(5x - 2)(5x + 2)$, not $(5x - 2)^2$



Name _____ Class _____ Date _____

Practice (continued) *Form G*

Factoring Special Cases

Factor each expression.

26. $m^2 - 49$
$(m + 7)(m - 7)$

27. $c^2 - 100$
$(c + 10)(c - 10)$

28. $p^2 - 16$
$(p + 4)(p - 4)$

29. $4a^2 - 25$
$(2a + 5)(2a - 5)$

30. $64n^2 - 1$
$(8n + 1)(8n - 1)$

31. $25x^2 - 144$
$(5x + 12)(5x - 12)$

32. $50g^2 - 8$
$2(5g + 2)(5g - 2)$

33. $8d^2 - 8$
$8(d + 1)(d - 1)$

34. $27x^2 - 48$
$3(3x + 4)(3x - 4)$

35. $24e^2 - 54$
$6(2e + 3)(2e - 3)$

36. $245k^2 - 20$
$5(7k + 2)(7k - 2)$

37. $112h^2 - 63$
$7(4h + 3)(4h - 3)$

38. $48x^2 + 72x + 27$
$3(4x + 3)^2$

39. $8b^2 + 80b + 200$
$8(b + 5)^2$

40. $48w^2 + 48w + 12$
$12(2w + 1)^2$

41. $45s^2 - 210s + 245$
$5(3s - 7)^2$

42. $45t^2 - 72t + 24$
$3(15t^2 - 24t + 8)$

43. $100z^2 - 120z + 36$
$4(5z - 3)^2$

44. Writing Explain how to recognize a perfect-square trinomial.
The coefficient of the squared term and the constant will be perfect squares. Twice the product of these numbers is the coeffiecient of the middle term.The sign before the constant will be positive.

45. a. Open-Ended Write an expression that shows the factored form of a difference of two squares. Answers may vary. Sample: $(2x + 3)(2x - 3)$

b. Explain how you know that your expression is a difference of two squares.
Answers may vary. Sample: $4x^2 - 9$; $4x^2$ and 9 are squares and they are separated by a subtraction.

Factor each expression.

46. $36s^8 - 60s^4 + 25$
$(6s^4 - 5)^2$

47. $c^{10} - 30c^5d^2 + 225d^4$
$(c^5 - 15d^2)^2$

48. $25n^6 + 40n^3 + 16$
$(5n^3 + 4)^2$

Mental Math **For Exercises 49–51, find a pair of factors for each number by using the difference of two squares.**

49. 24
$24 = 5^2 - 1^2$
$= (5 + 1)(5 - 1) = (6)(4)$

50. 28
$28 = 8^2 - 6^2$
$= (8 - 6)(8 + 6) = (2)(14)$

51. 72
$72 = 9^2 - 3^2$
$= (9 + 3)(9 - 3) = (12)(6)$

52. Reasoning Explain how reversing the rules for multiplying squares of binomials can help you factor a perfect-square trinomial.
When the b term in a trinomial is exactly twice the product of a and c, you can factor it as $(a + b)^2$ or as $(a - b)^2$.

53. Writing The area of a square parking lot is $49p^4 - 84p^2 + 36$. Explain how you would find the length of the parking lot.
Factor $49p^4 - 84p^2 + 36$ to find the length. You get $(7p^2 - 6)^2$ so each side has a length of $(7p^2 - 6)$.