NAME _____ DATE _____ PERIOD _____

8-1 Practice Adding and Subtracting Polynomials

Find each sum or difference.

1. $(2x + 3y) + (4x + 9y)$ $6x + 12y$

2. $(6s + 5t) + (4t + 8s)$ $14s + 9t$

3. $(5a + 9b) - (2a + 4b)$ $3a + 5b$

4. $(11m - 7n) - (2m + 6n)$ $9m - 13n$

5. $(m^2 - m) + (2m + m^2)$ $2m^2 + m$

6. $(x^2 - 3x) - (2x^2 + 5x)$ $-x^2 - 8x$

7. $(d^2 - d + 5) - (2d + 5)$ $d^2 - 3d$

8. $(2h^2 - 5h) + (7h - 3h^2)$ $-h^2 + 2h$

9. $(5f + g - 2) + (-2f + 3)$ $3f + g + 1$

10. $(6k^2 + 2k + 9) + (4k^2 - 5k)$ $10k^2 - 3k + 9$

Determine whether each expression is a polynomial. If it is a polynomial, find the degree and determine whether it is a *monomial, binomial,* or *trinomial.*

11. $5mt + t^2$
yes; 2; binomial

12. $4by + 2b - by$
yes; 2; binomial

13. -32
yes; 0; monomial

14. $\frac{3x}{7}$
yes; 1; monomial

15. $5x^2 - 3x^{-4}$
no

16. $2c^2 + 8c + 9 - 3$
yes; 2; trinomial

Write each polynomial in standard form. Identify the leading coefficient.

17. $3x + 1 + 2x^2$
$2x^2 + 3x + 1$; 2

18. $5x - 6 + 3x^2$
$3x^2 + 5x - 6$; 3

19. $9x^2 + 2 + x^3 + x$
$x^3 + 9x^2 + x + 2$; 1

20. $-3 + 3x^3 - x^2 + 4x$
$3x^3 - x^2 + 4x - 3$; 3

21. $x^2 + 3x^3 + 27 - x$
$3x^3 + x^2 - x + 27$; 3

22. $25 - x^3 + x$
$-x^3 + x + 25$; –1

23. $x - 3x^2 + 4 + 5x^3$
$5x^3 - 3x^2 + x + 4$; 5

24. $x^2 + 64 - x + 7x^3$
$7x^3 + x^2 - x + 64$; 7

NAME Answer Key DATE _____ PERIOD _____

8-2 & 8-3 Multiplying a Polynomials

Find each product.

1. $a(4a + 3)$
$4a^2 + 3a$

2. $-c(11c + 4)$
$-11c^2 - 4c$

3. $x(2x - 5)$
$2x^2 - 5x$

4. $2y(y - 4)$
$2y^2 - 8y$

5. $-3n(n^2 + 2n)$
$-3n^3 - 6n^2$

6. $4h(3h - 5)$
$12h^2 - 20h$

7. $3x(5x^2 - x + 4)$
$15x^3 - 3x^2 + 12x$

8. $7c(5 - 2c^2 + c^3)$
$35c - 14c^3 + 7c^4$

9. $-4b(1 - 9b - 2b^2)$
$-4b + 36b^2 + 8b^3$

10. $6y(-5 - y + 4y^2)$
$-30y - 6y^2 + 24y^3$

11. $2m^2(2m^2 + 3m - 5)$
$4m^4 + 6m^3 - 10m^2$

12. $-3n^2(-2n^2 + 3n + 4)$
$6n^4 - 9n^3 - 12n^2$

Simplify each expression.

13. $w(3w + 2) + 5w$
$3w^2 + 7w$

14. $f(5f - 3) - 2f$
$5f^2 - 5f$

15. $-p(2p - 8) - 5p$
$-2p^2 + 3p$

16. $y^2(-4y + 5) - 6y^2$
$-4y^3 - y^2$

17. $2x(3x^2 + 4) - 3x^3$
$x^3 + 8x$

18. $4a(5a^2 - 4) + 9a$
$20a^3 - 7a$

19. $4b(-5b - 3) - 2(b^2 - 7b - 4)$
$-20b^2 - 12b - 2b^2 + 14b + 8$
$-22b^2 + 2b + 8$

20. $3m(3m + 6) - 3(m^2 + 4m + 1)$
$9m^2 + 18m - 3m^2 - 12m - 3$
$6m^2 + 6m - 3$

NAME _____ DATE _____ PERIOD _____

Find each product.

1. $(m + 4)(m + 1)$

$m^2 + 5m + 4$

2. $(x + 2)(x + 2)$

$x^2 + 4x + 4$

3. $(b + 3)(b + 4)$

$b^2 + 7b + 12$

4. $(t + 4)(t - 3)$

$t^2 + t - 12$

5. $(r + 1)(r - 2)$

$r^2 - r - 2$

6. $(n - 5)(n + 1)$

$n^2 - 4n - 5$

7. $(3c + 1)(c - 2)$

$3c^2 - 5c - 2$

8. $(2x - 6)(x + 3)$

$2x^2 - 18$

9. $(d - 1)(5d - 4)$

$5d^2 - 9d + 4$

10. $(2\ell + 5)(\ell - 4)$

$2\ell^2 - 3\ell - 20$

11. $(3n - 7)(n + 3)$

$3n^2 + 2n - 21$

12. $(q + 5)(5q - 1)$

$5q^2 + 24q - 5$

13. $(3b + 3)(3b - 2)$

$9b^2 + 3b - 6$

14. $(2m + 2)(3m - 3)$

$6m^2 - 6$

15. $(4c + 1)(2c + 1)$

$8c^2 + 6c + 1$

16. $(5a - 2)(2a - 3)$

$10a^2 - 19a + 6$

17. $(4h - 2)(4h - 1)$

$16h^2 - 12h + 2$

18. $(x - y)(2x - y)$

$2x^2 - 3xy + y^2$

19. $(w + 4)(w^2 + 3w - 6)$

$w^3 + 7w^2 + 6w - 24$

20. $(t + 1)(t^2 + 2t + 4)$

$t^3 + 3t^2 + 6t + 4$

21. $(k - 4)(k^2 + 5k - 2)$

$k^3 + k^2 - 22k + 8$

22. $(m + 3)(m^2 + 3m + 5)$

$m^3 + 6m^2 + 14m + 15$

NAME _____ DATE _____ PERIOD _____

8-5 Using the Distributive Property

Factor each polynomial.

1. $7x + 49$
7(x + 7)

2. $8m - 6$
2(4m – 3)

3. $5a^2 - 15$
5(a^2 – 3)

4. $10q - 25q^2$
5q(2 – 5q)

5. $8ax - 56a$
8a(x – 7)

6. $81r + 48rt$
3r(27 + 16t)

7. $t^2h + 3t$
t (th + 3)

8. $a^2b^2 + a$
a(ab^2 + 1)

9. $x + x^2y + x^3y^2$
x(1 + xy + x^2y^2)

10. $3p^2r^2 + 6pr + p$
p(3pr^2 + 6r + 1)

11. $4a^2b^2 + 16ab + 12a$
4a(ab^2 + 4b + 3)

12. $10h^3n^3 - 2hn^2 + 14hn$
2hn(5h^2n^2 – n + 7)

13. $x^2 + 3x + x + 3$
(x + 1)(x + 3)

14. $b^2 - 2b + 3b - 6$
(b + 3)(b – 2)

15. $2j^2 + 2j + 3j + 3$
(2j + 3)(j + 1)

16. $2a^2 - 4a + a - 2$
(2a + 1)(a – 2)

17. $6t^2 - 4t - 3t + 2$
(2t – 1)(3t – 2)

18. $9x^2 - 3xy + 6x - 2y$
(3x + 2)(3x – y)

Solve each equation. Check your solutions.

19. $x(x - 8) = 0$ **{0, 8}**

20. $b(b + 12) = 0$ **{–12, 0}**

21. $(m - 3)(m + 5) = 0$ **{–5, 3}**

22. $(a - 9)(2a + 1) = 0$ $\left\{-\frac{1}{2}, 9\right\}$

23. $x^2 - 5x = 0$ **{0, 5}**

24. $y^2 + 3y = 0$ **{–3, 0}**

25. $3a^2 = 6a$ **{0, 2}**

26. $2x^2 = 3x$ $\left\{0, \frac{3}{2}\right\}$

NAME _____ DATE _____ PERIOD _____

8-6 Practice Factoring Quadratic Trinomials

Factor each polynomial.

1. $t^2 + 8t + 12$
$(t + 2)(t + 6)$

2. $n^2 + 7n + 12$
$(n + 3)(n + 4)$

3. $p^2 + 9p + 20$
$(p + 5)(p + 4)$

4. $h^2 + 9h + 18$
$(h + 6)(h + 3)$

5. $n^2 + 3n - 18$
$(n + 6)(n - 3)$

6. $x^2 + 2x - 8$
$(x + 4)(x - 2)$

7. $r^2 + 4r - 12$
$(r + 6)(r - 2)$

8. $x^2 - x - 12$
$(x - 4)(x + 3)$

9. $w^2 - w - 6$
$(w - 3)(w + 2)$

10. $y^2 - 6y + 8$
$(y - 4)(y - 2)$

11. $t^2 - 15t + 56$
$(t - 8)(t - 7)$

12. $-4 - 3m + m^2$
$(-4 + m)(1 + m)$

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

13. $2x^2 + 5x + 2$
$(2x + 1)(x + 2)$

14. $3n^2 + 5n + 2$
$(3n + 2)(n + 1)$

15. $2t^2 + 9t - 5$
$(2t - 1)(t + 5)$

16. $3g^2 - 7g + 2$
$(3g - 1)(g - 2)$

17. $2t^2 - 11t + 15$
$(2t - 5)(t - 3)$

18. $2x^2 + 3x - 6$
prime

19. $2y^2 + y - 1$
$(2y - 1)(y + 1)$

20. $4h^2 + 8h - 5$
$(2h + 5)(2h - 1)$

21. $4x^2 - 3x - 3$
prime

22. $4b^2 + 15b - 4$
$(4b - 1)(b + 4)$

23. $9p^2 + 6p - 8$
$(3p - 2)(3p + 4)$

24. $6q^2 - 13q + 6$
$(3q - 2)(2q - 3)$

NAME _____ DATE _____ PERIOD _____

8-7 Practice Factoring Special Products

Determine whether each trinomial is a perfect square trinomial. Write *yes* or *no*. If so, factor it.

1. $m^2 - 6m + 9$
yes; $(m - 3)^2$

2. $r^2 + 4r + 4$
yes; $(r + 2)^2$

3. $g^2 - 14g + 49$
yes; $(g - 7)^2$

4. $2w^2 - 4w + 9$
no

5. $4d^2 - 4d + 1$
yes; $(2d - 1)^2$

6. $9n^2 + 30n + 25$
yes; $(3n + 5)^2$

Factor each polynomial, if possible. If the polynomial cannot be factored, write *prime*.

7. $a^2 - 4$
$(a + 2)(a - 2)$

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

9. $36t^2 - 24t + 4$
$4(3t - 1)^2$

10. $4h^2 - 56$
$4(h^2 - 14)$

11. $17a^2 - 24ab$
$a(17a - 24b)$

12. $q^2 - 14q + 36$
prime

13. $y^2 + 24y + 144$
$(y + 12)^2$

14. $6d^2 - 96$
$6(d + 4)(d - 4)$

15. $1 - 49d^2$
$(1 + 7d)(1 - 7d)$

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

17. $k^2 + 25$
prime

18. $36 - 100w^2$
$4(3+ 5w)(3 - 5w)$

19. $t^2 - 18t + 81$
$(t - 9)^2$

20. $4h^2 - 25g^2$
$(2h + 5g)(2h - 5g)$

21. $64m^2 - 9y^2$
$(8m + 3y)(8m - 3y)$

22. $4c^2 + 2cd + d^2$
prime

23. $49r^2 + 14r + 4$
prime

24. $8x^2 - 72p^2$
$8(x + 3p)(x - 3p)$

25. $20q^2 - 5r^2$
$5(2q + r)(2q - r)$

26. $32a^2 - 50b^2$
$2(4a + 5b)(4a - 5b)$