

Name: key
Algebra 1

Date: _____
Band: _____

Polynomials & Factoring Review

LT#1: Classify, add, and subtract polynomials.

Find the degree of each monomial.

1. $6xy$

2

2. $-3b^2c^4$

6

3. $12m^7n$

8

4. $-8mn^2$

3

5. $10a^2b^3$

5

Simplify each sum or difference.

6. $6r^3 + 7r^3$

$13r^3$

7. $23u^2v - 19u^2v$

$4u^2v$

8. $(5g - 2g) + (2g^2 + 6g)$

$2g^2 + 9g$

9. $t^4 + 9t^4$

$10t^4$

10. $(3n^2 - 4n + 8) - (-4n^2 + 5n)$

$7n^2 - 9n + 8$

12. The perimeter of a pentagon is $20t + 7$. Four sides have the following lengths: $6t$, $2t$, $4t - 5$, and $5t + 1$. What is the length of the fifth side?

$20t + 7 - 6t - 2t - (4t - 5) - (5t + 1)$

$(20t + 7) - (6t) - (2t) - (4t - 5) - (5t + 1)$

$3t - 3$

LT#2: Multiply a monomial by a polynomial.

Simplify each product.

13. $3x(x + 6)$

$$3x^2 + 9x$$

14. $-z^2(z - 9)$

$$-z^3 + 9z^2$$

15. $2x(4x^2 - 7x + 6)$

$$8x^3 - 14x^2 + 12x$$

16. $2w(w - 7)$

$$2w^2 - 14w$$

17. $4n(3n^2 + 6n - 9)$

$$12n^3 + 24n^2 - 36n$$

LT#3: Factor a monomial from a polynomial.

Factor each polynomial.

18. $12x - 9$

$$3(4x - 3)$$

19. $24n^3 - 40n^2 + 72n$

$$8n(3n^2 - 5n + 9)$$

20. $14b^2c^3 + 21bc^5$

$$7bc^3(2b + 3c^2)$$

21. $15r + 6$

$$3(5r + 3)$$

22. $18x^2y - 27x^3y^2$

$$9x^2y(2 - 3xy)$$

LT#4: Multiply two binomials or a binomial by a trinomial.

Simplify each product.

23. $(x - 2)(3x - 4)$

$$3x^2 - 4x - 6x + 8$$

$$3x^2 - 10x + 8$$

24. $(3x + 2)(x + 7)$

$$3x^2 + 21x + 2x + 14$$

$$3x^2 + 23x + 14$$

25. $(4x - 1)(2x + 5)$

$$8x^2 + 20x - 2x - 5$$

$$8x^2 + 18x - 5$$

26. $(4x + 5)(x + 3)$

$4x^2 + 12x + 5x + 15$

$4x^2 + 17x + 15$

27. $(2x - 9)(5x + 4)$

$10x^2 + 8x - 45x - 36$

$10x^2 - 37x - 36$

LT#5: Find the square of a binomial and to find the product of a sum and difference.

Simplify each product.

28. $(x + 6)^2 = (x + 6)(x + 6)$

$x^2 + 6x + 6x + 36$

$x^2 + 12x + 36$

29. $(2s + 7)^2 = (2s + 7)(2s + 7)$

$4s^2 + 14s + 14s + 49$

$4s^2 + 28s + 49$

30. $(3x - 8)^2 = (3x - 8)(3x - 8)$

$9x^2 - 24x - 24x + 64$

$9x^2 - 48x + 64$

31. $(v + 7)(v - 7)$

$v^2 - 7v + 7v - 49$

$v^2 - 49$

32. $(5s - t)(5s + t)$

$25s^2 + 5st - 5st - t^2$

$25s^2 - t^2$

33. $(3p^2 + 10q)(3p^2 - 10q)$

$9p^4 - 30p^2q + 30p^2q - 100q^2$

$9p^4 - 100q^2$

34. $(w + 2)^2 = (w + 2)(w + 2)$

$w^2 + 2w + 2w + 4$

$w^2 + 4w + 4$

35. $(5x - 3)^2 = (5x - 3)(5x - 3)$

$25x^2 - 15x - 15x + 9$

$25x^2 - 30x + 9$

36. $(b + 3)(b - 3)$

$b^2 - 3b + 3b - 9$

$b^2 - 9$

37. $(6t^2 + 11)(6t^2 - 11)$

$36t^4 - 66t^2 + 66t^2 - 121$

$36t^4 - 121$

LT#6: Factor trinomials of the form $x^2 + bx + c$.

Factor each expression.

38. $r^2 + 12r + 27$

27	12
9, 3	12

$(r + 9)(r + 3)$

39. $g^2 - 8g - 48$

-48	-8
-12, 4	-8

$(g - 12)(g + 4)$

40. $m^2 + 2m - 35$

-35	2
7, -5	2

$(m + 7)(m - 5)$

$$\begin{array}{r|l} 2 & 3 \\ \hline 2,1 & 3 \end{array}$$

41. $b^2 + 3b + 2$

$$(b+2)(b+1)$$

$$\begin{array}{r|l} 12 & -8 \\ \hline -b, -2 & -8 \end{array}$$

42. $m^2 - 8b + 12$

$$(m-6)(m-2)$$

43. $x^2 + 2x - 8$

$$(x+4)(x-2)$$

$$\begin{array}{r|l} -8 & 2 \\ \hline 4, -2 & 2 \end{array}$$

$$\begin{array}{r|l} -20 & -1 \\ \hline -5, 4 & -1 \end{array}$$

44. $a^2 - a - 20$

$$(a-5)(a+4)$$

LT#7: Factor trinomials of the form $ax^2 + bx + c$.

Factor each expression.

45. $3d^2 - 13d + 12$

$$\begin{array}{r|l} 36 & 15 \\ \hline 12, 3 & 15 \end{array}$$

$$3d^2 - 9d - 4d + 12$$

$$3d(d-3) - 4(d-3)$$

$$(3d-4)(d-3)$$

46. $8y^2 + 60y + 72$

$$4(2y^2 + 15y + 18)$$

$$4(2y^2 + 12y + 3y + 18)$$

$$4[2y(y+6) + 3(y+6)]$$

$$4(2y+3)(y+6)$$

47. $9w^2 - 75w - 54$

$$3(3w^2 - 25w - 18)$$

$$3(3w^2 - 27w + 2w - 18)$$

$$3[3w(w-9) + 2(w-9)]$$

$$3(3w+2)(w-9)$$

$$\begin{array}{r|l} 54 & -25 \\ \hline -27, 2 & -25 \end{array}$$

$$\begin{array}{r|l} 36 & -13 \\ \hline -9, -4 & -13 \end{array}$$

$$\begin{array}{r|l} -42 & 11 \\ \hline -14, -3 & 11 \end{array}$$

48. $7y^2 + 11y - 6$

$$7y^2 + 14y - 3y - 6$$

$$7y(y+2) - 3(y+2)$$

$$(7y-3)(y+2)$$

49. $10x^2 - 53x - 11$

$$10x^2 - 55x + 2x - 11$$

$$5x(2x-11) + 2(x-11)$$

$$(5x+1)(2x-11)$$

$$\begin{array}{r|l} -110 & -53 \\ \hline -55, 2 & -53 \end{array}$$

Factor completely.

50. $8h^2 + 36h + 16$

$$\begin{array}{r|l} 8 & 9 \\ \hline 8, 1 & 9 \end{array}$$

$$4(2h^2 + 9h + 4)$$

$$4(2h^2 + 8h + 1h + 4)$$

$$4[2h(h+4) + 1(h+4)]$$

$$4(2h+1)(h+4)$$

LT#8: Factor perfect-square trinomials and the differences of two squares.

Factor each expression.

51. $4k^2 - 49$

$(2k-7)(2k+7)$

52. $9z^2 + 42z + 49$

$(3z+7)^2$

LT#9: Factor higher-degree polynomials by grouping.

Factor each expression.

53. $12n^3 - 3n^2 + 16n - 4$

$3n^2(4n-1) + 4(4n-1)$

$(3n^2+4)(4n-1)$

54. $3p^3 - p^2 - 6p + 2$

$p^2(3p-1) - 2(3p-1)$

$(p^2-2)(3p-1)$

55. $6n^3 - 24n^2 + n - 4$

$6n^2(n-4) + 1(n-4)$

$(6n^2-1)(n-4)$

Factor completely.

56. $2p^4 + 6p^3 - 8p^2 - 4p$

$2p^3(p+3) - 4p(2p-1)$

not factorable

57. A cereal box in the shape of a rectangular prism has a volume of $18x^3 - 3x^2 - 6x$. What are three possible linear expressions for the dimensions of the cereal box?

$18x^3 - 3x^2 - 6x = 3x(6x^2 - x - 2)$

$= 3x(6x^2 - 4x + 3x - 2)$

$= 3x[2x(3x-2) + 1(3x-2)]$

$= 3x(2x+1)(3x-2)$

-12	-1
-4, 3	-1

$l = 3x$

$w = 2x+1$

$h = 3x-2$