Name Answer Key

Algebra I; Chapter 1-8 Review; 100 Points

Problems 1-25 (4 points per problem)

State whether the number below is prime or composite. If the number is composite, determine its prime factorization. Use exponents in your final answer, if necessary.

1. 945

5 | 189
3 | 63
9 | 7
3 | 3

1. $3^3 \cdot 5 \cdot 7$

2. 113

2. prime

Factor the expression below completely (use prime factors only). Do not use exponents in your final answer.

3. $147 r^3 s t^2$

7 | 21
3 | 7

3. $3 \cdot 7 \cdot 7 \cdot r \cdot r \cdot r \cdot s \cdot t \cdot t$

Factor each polynomial expression below completely. If the polynomial cannot be factored using integers, write prime.

4. $72q^2 + 98r^2$

$2(36q^2 + 49r^2)$

5. $42s - 63s^2 - 72t + 108ts$

$3(14s - 21s^2 - 24t + 36ts)$

$3[7s(2-3s) - 12t(2-3s)$

4. $2(36q^2 + 49r^2)$

5. $3(2-3s)(7s-12t)$

6. $4x^3 - 72x^2 + 324x$

$4x(x^2 - 18x + 81)$

7. $-64z^4 + 121p^2$

$-(64z^4 - 121p^2)$

$-(8z^2 - 11p)(8z^2 + 11p)$

6. $4x(x-9)^2$

7. $-(8z^2 - 11p)(8z^2 + 11p)$

Factor each polynomial expression below completely. If the polynomial cannot be factored using integers, write prime.

8. $2x^2 + 3x - 54$ 9. $2x^2 - 16x - 32$ 10. $12w^2 - 36r^2$

$2x^2+12x-9x-54$ $2(x^2-8x-16)$ $12(w^2-3r^2)$

$2x(x+6)-9(x+6)$

8. $(2x-9)(x+6)$ 9. $2(x^2-8x-16)$ 10. $12(w^2-3r^2)$

Complete the following definitions.

11. Whole numbers that have only 1 and itself as factors are prime numbers (2 words).
12. A prime polynomial (2 words) is a polynomial expression that cannot be written as the product of two polynomials with integral coefficients.
13. A number that can be expressed as the square of a rational number is known as a perfect square (2 words).
14. Factored form: polynomial is written as a product of unfactorable polynomials w/ integer coefficients.

Solve the following word problems. Be sure to indicate a labeled answer.

15. Determine the area of a square that has a perimeter of $(8x - 12)$ cm.

$P=4l$ $(2x-3)(2x-3)$

$8x-12=4l$ $4x^2-6x-6x+9$

$2x-3=l$

2x-3 | 2x-3

15. $4x^2-12x+9$ cm^2

16. The area of a circle is $(9x^2 - 24x + 16)\ \pi$ square inches. What is the radius of the circle?

$A=\pi r^2$

$9x^2-24x+16$

$(3x-4)^2$

16. $r=3x-4$ inches

Determine the solution set of the following quadratic equations. Be sure to indicate all solutions.

17. $4n^2 + 9 = 12n$

$4n^2 - 12n + 9 = 0$
$4n^2 - 6n - 6n + 9 = 0$
$2n(2n-3) - 3(2n-3) = 0$
$(2n-3)(2n-3)$

17. $n = \frac{3}{2}$

18. $2w^2 = 128$

$2w^2 - 128 = 0$
$2(w^2 - 64) = 0$
$2(w+8)(w-8)$

18. $w = 8, w = -8$

19. $17r = 3r^2$

$0 = 3r^2 - 17r$
$0 = r(3r - 17)$

20. $6r^2 = r + 12$

$6r^2 - r - 12 = 0$
$6r^2 + 8r - 9r - 12 = 0$
$2r(3r+4) - 3(3r+4) = 0$
$(2r-3)(3r+4) = 0$

21. $x^2 + 2x - 35 = 0$

$(x-5)(x+7) = 0$

19. $r = 0$ or $r = \frac{17}{3}$

20. $r = \frac{3}{2}$ or $r = \frac{-4}{3}$

21. $x = 5$ or $x = -7$

Determine all values of k so that the trinomial can be factored using integers.

22. $2q^2 + kq + 18$

36
1 36
2 18
3 12
4 9
6 6

22. $\pm 37, \pm 20, \pm 15, \pm 13, \pm 12$

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

23. $2a^2 - 9a - 143$

$2a^2 - 22a + 13a - 143$
$2a(a-11) + 13(a-11)$

24. $3y^3 + 9y^2 - 9y$

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

23. $(a-11)(2a+13)$

24. $3y(y^2 + 3y - 3)$

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

25. $18r^3 + 27rs - 8r^2s - 12s^2$

$9r(2r^2+3s) - 4s(2r^2+3s)$

25. $(9r-4s)(2r^2+3s)$