Unit V – Second Degree Relations and Higher - Polynomials
Part C – Solving Equations and Inequalities by Factoring
Lesson 1 – Principle of Zero-Products

Solve the following polynomial equations, knowing that each can be rewritten as a product of first degree factors as indicated.

1. $x^2 + 6x + 8 = 0$
   $(x + 4)(x + 2) = 0$

2. $m^2 - 8m + 12 = 0$
   $(m - 6)(m - 2) = 0$

3. $n^2 + 3n = 0$
   $n(n + 3) = 0$

4. $x^3 + 4x^2 + 3x = 0$
   $x(x + 3)(x + 1) = 0$

5. $2a^3 + 9a^2 + 4a = 0$
   $a(2a + 1)(a + 4) = 0$

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

7. $18r^3 - 34r^2 + 16r = 0$
   $2r(9r - 8)(r - 1) = 0$

8. $6m^3 + 7m^2 - 3m = 0$
   $m(3m - 1)(2m + 3) = 0$

9. $3y^2 + 22y + 35 = 0$
   $(3y + 7)(y + 5) = 0$

Solve the following polynomial inequalities, knowing that each can be rewritten as a product of first degree factors as indicated. Show the solution set on a number line.

10. $x^2 + 8x + 15 > 0$
    $(x + 3)(x + 5) > 0$

11. $x^2 - 6x - 16 < 0$
    $(x - 8)(x + 2) < 0$

12. $x^3 - 9x \geq 0$
    $x(x - 3)(x + 3) \geq 0$

13. $x^3 + 4x^2 - 21x < 0$
    $x(x + 7)(x - 3) < 0$

14. $b^2 - 3b - 28 \geq 0$
    $(b - 7)(b + 4) \geq 0$

15. $4t^2 - 9t - 9 \leq 0$
    $(4t + 3)(t - 3) \leq 0$

16. $x^3 - 13x + 12 > 0$
    $(x - 3)(x + 4)(x - 1) > 0$

17. $x^4 - 13x^2 + 36 > 0$
    $(x - 3)(x + 3)(x - 2)(x + 2) > 0$

EXTRA PRACTICE — Answer Key

Unit V – Second Degree Relations and Higher - Polynomials
Part C – Solving Equations and Inequalities by Factoring
Lesson 1 – Principle of Zero-Products

Solve the following polynomial equations, knowing that each can be rewritten as a product of first degree factors as indicated.

1. $S = \{^{-}4, ^{-}2\}$

2. $S = \{6, 2\}$

3. $S = \{0, ^{-}3\}$

4. $S = \{0, ^{-}3, ^{-}1\}$

5. $S = \left\{0, \frac{^{-}1}{2}, ^{-}4\right\}$

6. $S = \left\{\frac{3}{2}\right\}$

7. $S = \left\{0, \frac{8}{9}, 1\right\}$

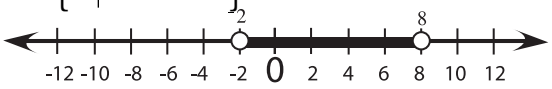
8. $S = \left\{0, \frac{1}{3}, \frac{^{-}3}{2}\right\}$

9. $S = \left\{\frac{^{-}7}{3}, ^{-}5\right\}$

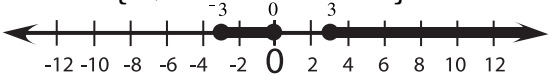
Solve the following polynomial inequalities, knowing that each can be rewritten as a product of first degree factors as indicated. Show the solution set on a number line.

10. $S = \{x \mid x < ^{-}5 \text{ or } x > ^{-}3\}$

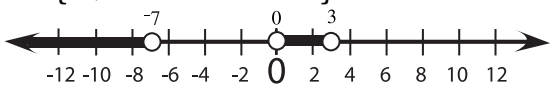
11. $S = \{x \mid ^{-}2 < x < 8\}$



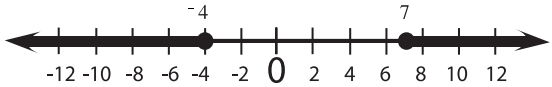
12. $S = \{x \mid ^{-}3 \le x \le 0 \text{ or } x \ge 3\}$



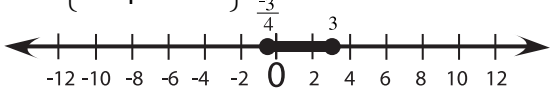
13. $S = \{x \mid x < ^{-}7 \text{ or } 0 < x < 3\}$



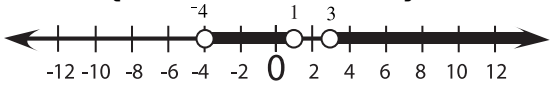
14. $S = \{b \mid b \le ^{-}4 \text{ or } b \ge 7\}$



15. $S = \left\{t \mid \frac{^{-}3}{4} \le t \le 3\right\}$



16. $S = \{x \mid ^{-}4 < x < 1 \text{ or } x > 3\}$



17. $S = \{x \mid x < ^{-}3 \text{ or } ^{-}2 < x < 2 \text{ or } x > 3\}$