EXTRA PRACTICE — Exercises

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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.

 $m^{2} - 8m + 12 = 0$ 2. (m-6)(m-2) = 0 $x^{2} + 6x + 8 = 0$ 1. (x+4)(x+2) = 0 $x^3 + 4x^2 + 3x = 0$ $n^2 + 3n = 0$ 4. x(x+3)(x+1) = 03. n(n+3) = 0 $4x^{2} - 12x + 9 = 0$ 6. (2x - 3)(2x - 3) = 0 $2a^3 + 9a^2 + 4a = 0$ 5. a(2a+1)(a+4) = 0 $18r^3 - 34r^2 + 16r = 0$ $6m^3 + 7m^2 - 3m = 0$ 8. m(3m-1)(2m+3) = 07. 2r(9r-8)(r-1) = 0 $3y^2 + 22y + 35 = 0$ 9. (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.
$$\begin{aligned} x^{2} + 8x + 15 > 0 \\ (x+3)(x+5) > 0 \end{aligned}$$
11.
$$\begin{aligned} x^{2} - 6x - 16 < 0 \\ (x-8)(x+2) < 0 \end{aligned}$$
12.
$$\begin{aligned} x^{3} - 9x \ge 0 \\ x(x-3)(x+3) \ge 0 \end{aligned}$$
13.
$$\begin{aligned} x^{3} + 4x^{2} - 21x < 0 \\ x(x+7)(x-3) < 0 \end{aligned}$$
14.
$$\begin{aligned} b^{2} - 3b - 28 \ge 0 \\ (b-7)(b+4) \ge 0 \end{aligned}$$
15.
$$\begin{aligned} 4t^{2} - 9t - 9 \le 0 \\ (4t+3)(t-3) \le 0 \end{aligned}$$
16.
$$\begin{aligned} x^{3} - 13x + 12 > 0 \\ (x-3)(x+4)(x-1) > 0 \end{aligned}$$
17.
$$\begin{aligned} x^{4} - 13x^{2} + 36 > 0 \\ (x-3)(x+3)(x-2)(x+2) > 0 \end{aligned}$$

EXTRA PRACTICE — Answer Key

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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. $S = \{0, -\frac{1}{2}, -4\}$ 6. $S = \{\frac{3}{2}\}$ 7. $S = \{0, \frac{8}{9}, 1\}$ 8. $S = \{0, \frac{1}{3}, -\frac{3}{2}\}$ 9. $S = \{-\frac{7}{3}, -5\}$

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.
$$S = \left\{ x \mid x < 5 \text{ or } x > 3 \right\}$$

11. $S = \left\{ x \mid 2 < x < 8 \right\}_{2}$
12. $S = \left\{ x \mid 3 \le x \le 0 \text{ or } x \ge 3 \right\}$
13. $S = \left\{ x \mid x < 7 \text{ or } 0 < x < 3 \right\}$
14. $S = \left\{ b \mid b \le 4 \text{ or } b \ge 7 \right\}$
15. $S = \left\{ t \mid \frac{3}{4} \le t \le 3 \right\}_{-12 - 10 - 8 - 6 - 4 - 2} 0 = 2 + 6 - 8 - 10 - 12$
16. $S = \left\{ x \mid 4 < x < 1 \text{ or } x > 3 \right\}$
17. $S = \left\{ x \mid x < 3 \text{ or } -2 < x < 2 \text{ or } x > 3 \right\}$
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