

Questions from Chapter 6

1. Simplify: $\sqrt{121}$

$$\boxed{11}$$

2. Simplify: $\sqrt{20}$

$$\frac{\sqrt{4}\sqrt{5}}{\boxed{2\sqrt{5}}}$$

3. Simplify: $\sqrt{x^7y^{10}}$

$$\sqrt{x^6y^{10}} \sqrt{x}$$

$$\boxed{x^3y^5\sqrt{x}}$$

4. Simplify: $\sqrt{63x^2y^9z}$

$$\sqrt{9x^2y^8} \sqrt{7yz}$$

$$\boxed{3xy^4\sqrt{7yz}}$$

5. Simplify: $5\sqrt{49x^4y^{11}}$

$$5\sqrt{49x^4y^{10}} \sqrt{y}$$

$$5(7x^2y^5)\sqrt{y}$$

$$\boxed{35x^2y^5\sqrt{y}}$$

6. Simplify: $3x^2\sqrt{200xy^{20}z^3}$

$$3x^2\sqrt{100y^{20}z^2} \sqrt{2xz}$$

$$3x^2(10y^{10}z)\sqrt{2xz}$$

$$\boxed{30x^2y^{10}z\sqrt{2xz}}$$

7. Simplify: $3\sqrt{5} \cdot \sqrt{8}$

$$3\sqrt{40}$$

$$3\sqrt{4} \sqrt{10}$$

$$3(2)\sqrt{10}$$

$$\boxed{6\sqrt{10}}$$

8. Simplify: $2\sqrt{3}(5\sqrt{3}-\sqrt{5})$

$$10\sqrt{9} - 2\sqrt{15}$$

$$10(3) - 2\sqrt{15}$$

$$\boxed{30 - 2\sqrt{15}}$$

9. Simplify: $4\sqrt{2x}(\sqrt{3x^3} - 2\sqrt{4x^4})$

$$4\sqrt{6x^4} - 8\sqrt{8x^5}$$

$$4\sqrt{x^4} \sqrt{6} - 8\sqrt{4x^4} \sqrt{2x}$$

$$4x^2\sqrt{6} - 8(2x^2)\sqrt{2x}$$

$$\boxed{4x^2\sqrt{6} - 16x^2\sqrt{2x}}$$

10. Simplify: $\sqrt{5}(2\sqrt{5}-6)$

$$2\sqrt{25} - 6\sqrt{5}$$

$$2(5) - 6\sqrt{5}$$

$$\boxed{10 - 6\sqrt{5}}$$

11. Simplify: $(4\sqrt{3}+6)(2\sqrt{3}-5)$

$$8\sqrt{9} - 20\sqrt{3} + 12\sqrt{3} - 30$$

$$8(3) \quad \checkmark$$

$$24 - 8\sqrt{3} - 30$$

$$\boxed{-6 - 8\sqrt{3}}$$

12. Simplify: $(4\sqrt{3}-2)^2$

$$(4\sqrt{3}-2)(4\sqrt{3}-2)$$

$$16\sqrt{9} - 8\sqrt{3} - 8\sqrt{3} + 4$$

$$16(3) - 16\sqrt{3} + 4$$

$$48 - 16\sqrt{3} + 4$$

$$\boxed{52 - 16\sqrt{3}}$$

13. Simplify: $\sqrt[4]{81}$

$\sqrt[4]{3 \cdot 3 \cdot 3 \cdot 3}$

$\boxed{3}$

14. Simplify: $\sqrt[3]{16x^6y^5}$

$\sqrt[3]{\cancel{2 \cdot 2 \cdot 2} \cdot 2 \cdot \cancel{x \cdot x \cdot x \cdot x \cdot x} \cdot \cancel{y \cdot y \cdot y} \cdot y}$

$\boxed{2x^2y \sqrt[3]{2y^2}}$

10r

$\sqrt[3]{8x^6y^3} \sqrt[3]{2y^2}$

$\boxed{2x^2y \sqrt[3]{2y^2}}$

Review Questions

15. Factor: $30a^{10}b^5 + 20a^5b^6 - 5a^2b^3$

$\boxed{5a^2b^3 (6a^8b^2 + 4a^3b^3 - 1)}$

pull out GCF

16. Factor: $3xy + 3xz - 5y - 5z$

Grouping

$3xy + 3xz - 5y - 5z$

$3x(y+z) - 5(y+z)$

$\boxed{(y+z)(3x-5)}$

$\checkmark (y+z)(3x-5)$

$3xy + 5y + 3xz + 5z$

$3xy + 3xz - 5y - 5z$

17. Factor: $x^2 + 5x - 24$

$\boxed{(x+8)(x-3)}$

$\checkmark (x+8)(x-3)$

$x^2 - 3x + 8x - 24$

$x^2 + 5x - 24$

18. Factor: $10x^2 + 21x - 10$

$\overbrace{10x^2 + 21x - 10}^{\substack{-100 \text{ Mult} \\ +21 \text{ Add}}} + 25 - 4$

$\frac{10x^2 + 25x}{10x^2 + 25x} \quad \frac{-4x}{-4x} \quad \frac{-10}{-10}$

$5x(2x+5) - 4x - 10$

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

$\boxed{(2x+5)(5x-2)}$

$\checkmark 10x^2 - 4x + 25x - 10$

$10x^2 + 21x - 10$

19. Factor: $81x^4 - 49y^6$

$$\frac{\sqrt{81x^4}}{9x^2} \quad \frac{\sqrt{49y^6}}{7y^3}$$

$$\boxed{(9x^2 - 7y^3)(9x^2 + 7y^3)}$$

$$\begin{aligned} \sqrt{81x^4 + 63x^2y^3 - 63x^2y^3 - 49y^6} \\ 81x^4 - 49y^6 \end{aligned}$$

20. Solve: $x^2 - x - 42 = 0$

$$(x - 7)(x + 6) = 0$$

$$\begin{array}{r} x - 7 = 0 \\ +7 \quad +7 \\ \hline \end{array}$$

$$\boxed{x = 7}$$

Check

$$\begin{aligned} (7)^2 - 7 - 42 &= 0 \\ 49 - 7 - 42 &= 0 \\ 0 &= 0 \end{aligned}$$

$$\begin{array}{r} x + 6 = 0 \\ -6 \quad -6 \\ \hline \end{array}$$

$$\boxed{x = -6}$$

$$\begin{aligned} (-6)^2 - (-6) - 42 &= 0 \\ 36 + 6 - 42 &= 0 \\ 0 &= 0 \end{aligned}$$

21. Solve: $4x^2 + 8x + 3 = 0$

$$\overbrace{4x^2 + 8x + 3 = 0}^{+12 \text{ Mult} \quad +8 \text{ Add}}$$

$$\underline{4x^2} \quad \underline{+2x} \quad \underline{+6x} \quad \underline{+3}$$

$$4x^2 + 2x \quad +6x + 3$$

$$2x(2x+1) \quad +3(2x+1)$$

$$(2x+1)(2x+3) = 0$$

$$\begin{array}{r} 2x + 1 = 0 \\ -1 \quad -1 \\ \hline 2x = -1 \\ \frac{2x}{2} = \frac{-1}{2} \end{array}$$

$$\boxed{x = -\frac{1}{2}}$$

$$\begin{array}{r} 2x + 3 = 0 \\ -3 \quad -3 \\ \hline 2x = -3 \\ \frac{2x}{2} = \frac{-3}{2} \end{array}$$

$$\boxed{x = -\frac{3}{2}}$$

Check

$$\begin{array}{l|l} 4(-\frac{1}{2})^2 + 8(-\frac{1}{2}) + 3 = 0 & 4(-\frac{3}{2})^2 + 8(-\frac{3}{2}) + 3 = 0 \\ 0 = 0 & 0 = 0 \end{array}$$

22. Simplify: $\frac{2x^2 - 5x + 3}{x^2 - 1}$

$$\overbrace{2x^2 - 5x + 3}^{+6 \text{ Mult} \quad -5 \text{ Add}}$$

$$\underline{2x^2 - 2x} \quad \underline{-3x} \quad \underline{+3}$$

$$2x^2 - 2x \quad -3x + 3$$

$$2x(x-1) \quad -3(x-1)$$

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

$$\frac{(x-1)(2x-3)}{(x-1)(x+1)}$$

$$\boxed{\frac{2x-3}{x+1}}$$

23. Simplify: $|4| - |-3| + |2-8|$

$$|4| - |-3| + |2-8|$$

$$4 - 3 + |-6|$$

$$4 - 3 + 6$$

$$1 + 6$$

$$\boxed{7}$$

24. Solve for b: $5c = 6a - 2b$

$$5c = 6a - 2b$$

$$\underline{-6a} \quad \underline{-6a}$$

$$\underline{5c - 6a} = \underline{-2b}$$

$$\boxed{b = \frac{5c - 6a}{-2} = -\frac{5}{2}c + 3a}$$

25. Find the x-intercept for: $-x + 7y = 12$

x	y
-12	0

$$-x + 7(0) = 12$$

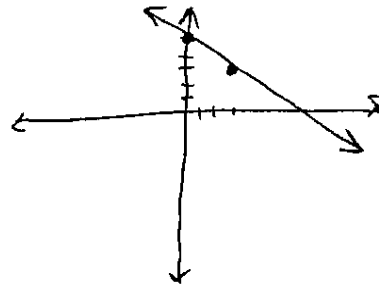
$$\frac{-x}{-1} = \frac{12}{-7}$$

$$x = -12$$

$$\boxed{(-12, 0)}$$

26. Graph: $y = -\frac{2}{3}x + 5$

$$m = \frac{-2}{3} \downarrow \uparrow \begin{matrix} 2 \\ 3 \end{matrix} \quad b = 5$$



27. Solve: $10 - 2x \geq 2(2x - 3)$

$$10 - 2x \geq 2(2x - 3)$$

$$10 - 2x \geq 4x - 6$$

$$\underline{-4x} \quad \underline{-4x}$$

$$\underline{10 - 6x} \geq \underline{-6}$$

$$\underline{-10}$$

$$\underline{-6x} \geq \underline{-16}$$

$$\underline{-6} \quad \underline{-6}$$

$$x \leq \frac{16}{6} = \frac{8}{3}$$

$$\boxed{x \leq \frac{8}{3}}$$

28. Simplify: $\frac{(a^2b^3)^4(ab^6)}{a^{10}b^5}$

$$\frac{a^8b^{12}ab^6}{a^{10}b^5}$$

$$\frac{a^9b^{18}}{a^{10}b^5}$$

$$\boxed{\frac{b^{13}}{a}}$$

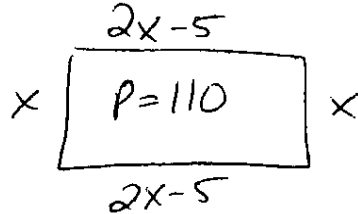
29. Translate into algebraic equation:

The square of a number less than 4 times a number is 5 more than twice a number.

$$4x - x^2 = 2x + 5$$

30. The length of a rectangular pool is 5 less than twice the width. The perimeter of the pool is 110 feet. Find the length and width of the pool. Label each distance correctly.

$$\begin{aligned} \text{Length} &= 2x - 5 \\ \text{Width} &= x \end{aligned}$$



$$\begin{aligned} \text{Length} &= 2(20) - 5 = 35 \\ \text{Width} &= 20 \end{aligned}$$

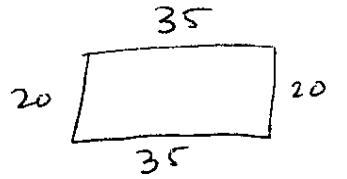
$$x + 2x - 5 + x + 2x - 5 = 110$$

$$6x - 10 = 110$$

$$\frac{110}{6} \quad \frac{110}{6}$$

$$\frac{6x}{6} = \frac{120}{6}$$

$$x = 20$$



$$20 + 35 + 20 + 35 = 110$$

$$110 = 110$$

31. If a bed cost \$675 after a 20% discount, what was the original cost?

$$\text{Original} - \text{Discount} = \text{New Price}$$

$$x - .20x = 675$$

$$\frac{.80x}{.80} = \frac{675}{.80}$$

$$\begin{array}{r} .80 \overline{) 67500} \\ \underline{640} \\ 350 \\ \underline{320} \\ 300 \\ \underline{240} \\ 600 \\ \underline{560} \\ 140 \end{array}$$

Original Price
\$843.75