Key

College Prep **Semester Review Ch. P**

Simplify

1. $(3x^2y^{-2})^{-3}(4xyz)$

$\frac{4xyz}{27x^{-6}y^{6}}$

$\frac{4y^7z}{27x^5}$

2. $\frac{(2x^2)^3}{2^{\frac{1}{2}}x^4}$

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

$\frac{8x^2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$4x^2\sqrt{2}$

or

$2^{\frac{3}{2}}x^2$

3. $\sqrt[3]{24a^4}$

$2a\sqrt[3]{3a}$

4. $\sqrt[5]{128x^5y^7}$

2^7

$2xy\sqrt[5]{4y^2}$

5. $\frac{4}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}}$ $\sqrt[3]{2^2}$

$\frac{4\sqrt[3]{4}}{2}$

$2\sqrt[3]{4}$

6. $\frac{3}{7-2\sqrt{3}} \cdot \frac{7+2\sqrt{3}}{7+2\sqrt{3}}$

$\frac{3(7+2\sqrt{3})}{49-12} = \frac{3(7+2\sqrt{3})}{37}$

7. $\frac{x^3-1}{x+1} \cdot \frac{x^2+1}{x^2-1}$

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

$\frac{(x^2+x+1)(x^2+1)}{(x+1)^2}$

8. $\frac{-3}{x} + \frac{x}{x^2+2}$

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

$\frac{-3x^2-6+x^2}{x(x^2+2)}$

$\frac{-2x^2-6}{x(x^2+2)}$

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

9. $\frac{\frac{3}{x}-4}{1+\frac{1}{x-1}} \cdot \frac{x(x-1)}{x(x-1)}$

$\frac{3(x-1)-4x(x-1)}{x(x-1)+x}$

$\frac{3x-3-4x^2+4x}{x^2-x+x}$

$\frac{-4x^2+7x-3}{x^2}$

10. Factor: x^3-64

$(x-4)(x^2+4x+16)$

Solve

11. $x^3 - 3x^2 - 3x + 9 = 0$

$x^2(x-3) - 3(x-3) = 0$

$(x^2-3)(x-3) = 0$

$\boxed{x = \pm\sqrt{3}, 3}$

12. $x^2 + 5x - 1 = 0$

$x = \dfrac{-5 \pm \sqrt{25-4(-1)}}{2}$

$= \boxed{\dfrac{-5 \pm \sqrt{29}}{2}}$

13. $x = 2\sqrt{x+3}$

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

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$

$x = 6, -2$

14. $\dfrac{3}{x+1} - \dfrac{7}{x+2} = \dfrac{1}{x^2+3x+2}$

$(x+1)(x+2)$

$3(x+2) - 7(x+1) = 1$

$3x + 6 - 7x - 7 = 1$

$-4x - 1 = 1$

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

Solve. Write solution in interval notation.

15. $x^3 < 2x^2 - x$

$x^3 - 2x^2 + x < 0$

$x(x^2 - 2x + 1) < 0$

$x(x-1)(x-1) < 0$

$x = 0, 1$

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

16. $\dfrac{x+1}{x-3} \le 2$

$x = 3$

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

$x + 1 = 2x - 6$

$7 = x$

$\boxed{(-\infty, 3) \cup [7, \infty)}$

17. $|7x - 5| < 3$

$7x - 5 = 3$ $\qquad -7x + 5 = 3$

$7x = 8$ $\qquad -7x = -2$

$x = \dfrac{8}{7}$ $\qquad x = \dfrac{2}{7}$

$\boxed{\left(\frac{2}{7}, \frac{8}{7}\right)}$