

Chapter 10 Review:

1. Factor the following Completely:

a. $-5x^7 + 5x^6 + 10x^5$
 $-5x^5(x^2 - x - 2)$
 $-5x^5(x-2)(x+1)$

$\underline{-5x^5(x-2)(x+1)} \quad (4)$

b. $\frac{3x^2}{27x^3 + 8}$
 $(3x+2)(9x^2 - 6x + 4)$

$\underline{(3x+2)(9x^2 - 6x + 4)} \quad (4)$

2. a. Solve for x: $(5x^3 + 2x^2 - 5x - 2) = 0$
 $x^2(5x+2) - 1(5x+2) = 0$
 $(x^2 - 1)(5x+2) = 0$
 $(x-1)(x+1)(5x+2) = 0$
 $x=1 \quad x=-1 \quad x=-\frac{2}{5}$

$\underline{x=1, x=-1, x=-\frac{2}{5}} \quad (4)$

Chapter 11 Review:

3. Multiply and Simplify: $\frac{4x+3}{9x^2-1} \cdot \frac{3x^3-x^2}{4x^2+3x}$
 $\frac{4x+3}{(3x+1)(3x-1)} \cdot \frac{x^2(3x-1)}{x(4x+3)}$

$\frac{x}{3x+1} \quad (5)$

$\frac{x}{3x+1}$

4. Subtract: $\frac{2x}{x^2-16} - \frac{1}{x^2-3x-4}$
 LCD: $(x+4)(x-4)(x+1)$

$$\frac{2x^2+x-4}{(x+4)(x-4)(x+1)} \quad (5)$$

$$\frac{2x(x+1) - 1(x+4)}{LCD} = \frac{2x^2+2x-x-4}{LCD} = \frac{2x^2+x-4}{(x+4)(x-4)(x+1)}$$

5. Find the domain of: $\frac{x+1}{x^2-x-6}$

$$\mathbb{R}; x \neq 3; x \neq -2 \quad (3)$$

Denominator $\neq 0$
 $x^2-x-6 \neq 0$
 $(x-3)(x+2) \neq 0$
 $x \neq 3 \quad x \neq -2$

6. Use **Synthetic division**:
 $(2x^4 + 3x^3 - 5x^2 + x + 2) \div (x-1)$

$$2x^3 + 5x^2 + 1R(3) \quad (5)$$

$$\begin{array}{r|rrrrr} 1 & 2 & 3 & -5 & 1 & 2 \\ & \downarrow & 2 & 5 & 0 & 1 \\ \hline & 2 & 5 & 0 & 1 & 3 \end{array}$$

7. Simplify the complex fraction:

$$\frac{5+9x}{7x-12} \quad (5)$$

$$\frac{\frac{5}{6x} + \frac{3}{2} \frac{3x}{2x}}{\frac{x}{7} - \frac{2}{x} \frac{6}{x}} = \frac{\frac{5+9x}{6x}}{\frac{7x-12}{6x}}$$

$$\frac{5+9x}{\cancel{6x}} \cdot \frac{\cancel{6x}}{7x-12} = \frac{5+9x}{7x-12}$$

8. Solve for x: $(x-5)(x+5)$

$$\left(\frac{15}{x^2 - 25} + \frac{1}{x-5} = \frac{6}{x+5} \right)$$

a. List the restriction on the variable (what can x not equal?)

$$x^2 - 25 \neq 0 \quad x - 5 \neq 0 \quad x + 5 \neq 0$$

$$x \neq 5 \quad x \neq -5$$

$$\underline{x \neq \pm 5} \quad (2)$$

b. Solve the equation for x:

Multiply by LCD:

$$15 + 1(x+5) = 6(x-5)$$

$$15 + x + 5 = 6x - 30$$

$$x + 20 = 6x - 30$$

$$50 = 5x$$

$$10 = x$$

$$\underline{x = 10} \quad (5)$$

Chapter 12 Review

9. Simplify: $\sqrt{63x^7y^6} = \sqrt{9x^6y^6} \sqrt{7x}$
 $3x^3y^3\sqrt{7x}$

$$\underline{3x^3y^3\sqrt{7x}} \quad (3)$$

10. Simplify: $\sqrt[4]{32x^{13}y^{18}} = \sqrt[4]{16x^{12}y^{16}} \sqrt[4]{2xy^2}$
 $2x^3y^4\sqrt[4]{2xy^2}$

$$\underline{2x^3y^4\sqrt[4]{2xy^2}} \quad (3)$$

11. Simplify: $\left(\frac{8x^{-12}y^{15}}{z^{-18}} \right)^{1/3}$

$$\sqrt[3]{\frac{8y^{15}z^{18}}{x^{12}}} = \frac{2y^5z^6}{x^4}$$

$$\underline{\frac{2y^5z^6}{x^4}} \quad (4)$$

12. Add: $2\sqrt{48x^3} - 7x\sqrt{12x}$

$$2\sqrt{16x^2} \sqrt{3x} - 7x\sqrt{4} \sqrt{3x}$$

$$2 \cdot 4x\sqrt{3x} - 7x \cdot 2\sqrt{3x}$$

$$8x\sqrt{3x} - 14x\sqrt{3x} = -6x\sqrt{3x}$$

$$\underline{-6x\sqrt{3x}} \quad (4)$$

13. Divide and Simplify: $\sqrt[3]{\frac{3y^{10}}{24x^{12}}}$

$$\sqrt[3]{\frac{y^{10}}{8x^{12}}} = \frac{\sqrt[3]{y^{10}}}{\sqrt[3]{8x^{12}}} = \frac{\sqrt[3]{y^9 \cdot y}}{2x^4} = \frac{y^3 \sqrt[3]{y}}{2x^4}$$

$$\underline{\frac{y^3 \sqrt[3]{y}}{2x^4}} \quad (4)$$

14. Rationalize the denominator and Simplify if possible.

$$\frac{5}{(3-\sqrt{2})(3+\sqrt{2})} = \frac{5(3+\sqrt{2})}{9-2} = \frac{15+5\sqrt{2}}{7}$$

$$\underline{\frac{15+5\sqrt{2}}{7}} \quad (4)$$

15. Solve for x: $(\sqrt{26+11x})^2 = (x+4)^2$

$$\underline{X=5 \quad X=-2} \quad (5)$$

$$26+11x = x^2 + 8x + 16$$

$$0 = x^2 - 3x - 10$$

$$0 = (x-5)(x+2)$$

$$X=5 \quad X=-2$$

16. Multiply: $(3+i)(4-i)$

$$12 + 4i - 3i - i^2$$

$$12 + i + 1 = 13 + i$$

$$\underline{13 + i} \quad (4)$$

17. Divide and simplify to the form $a + bi$:

$$\frac{7(3+2i)}{(3-2i)(3+2i)}$$

$$\frac{21 + 14i}{9 - 4i^2 - 1}$$

$$\frac{21 + 14i}{18} = \frac{21}{18} + \frac{14}{18}i$$

$$\underline{\frac{21}{18} + \frac{14}{18}i} \quad (5)$$

Chapter 13 Review

18. Use the Square Root Property to solve $(x+2)^2 = -25$

NOTE: Solution can be any complex number.

$$\sqrt{(x+2)^2} = \pm \sqrt{-25}$$

$$x+2 = \pm 5i$$

$$x = -2 \pm 5i$$

$$\underline{x = -2 \pm 5i} \quad (5)$$

19. Use the Quadratic Formula to find the solution to:

$$x^2 - 2x - 5 = 0$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-5)}}{2(1)}$$

$$= \frac{2 \pm \sqrt{4+20}}{2}$$

$$= \frac{2 \pm \sqrt{24}}{2}$$

$$\underline{x = 1 \pm \sqrt{6}} \quad (4)$$

$$x = \frac{2 \pm \sqrt{4 \cdot 6}}{2}$$

$$= \frac{2 \pm 2\sqrt{6}}{2}$$

$$= \frac{2(1 \pm \sqrt{6})}{2}$$

$$x = 1 \pm \sqrt{6}$$

20. State the Vertex of the following parabola:

$$f(x) = x^2 + 8x + 11 \quad \text{Vertex: } \underline{(-4, 5)} \quad (3)$$

$$x_v = \frac{-b}{2a} = \frac{-8}{2(1)} = -4$$

$$y_v = f(-4) = (-4)^2 + 8(-4) + 11$$

$$= 16 - 32 + 11$$

$$= 5$$

Chapter 14 Review:

21. a. Write in exponential Notation: $\log_b 2x = y$

a. $b^y = 2x$

b. Write in logarithmic Notation: $3^{5x} = N$

b. $\log_3 N = 5x$

22. Find the domain of: $f(x) = \log_5(3x+2)$

22. $x > -\frac{2}{3}$

Argument > 0
 $3x + 2 > 0$
 $3x > -2$
 $x > -\frac{2}{3}$

23. Solve the follow log and exponential equations for x : (Circle your answer) (4 points each)

a. $\log_3 81 = x$

$3^x = 81$
 $3^x = 3^4$
 $x = 4$

b. $\log_4 N = 3$

$N = 4^3$
 $N = 64$

c. $\log_x 121 = 2$

$x \neq -1$
 a base must be $\neq 1$
 $x^2 = 121$
 $x = \pm \sqrt{121}$
 $x = \pm 11$ ~~reject~~
 $x = 11$ since $x \neq 1$ a base

d. $2^{5x} = 64$

$2^{5x} = 2^6$
 $5x = 6$
 $x = \frac{6}{5}$

e. $3^{2x+5} = 27$

$3^{2x+5} = 3^3$

$2x + 5 = 3$

$2x = -2$

$x = -1$

if. $\left(\frac{2}{5}\right)^{7x} = \frac{8}{125}$

$\left(\frac{2}{5}\right)^{7x} = \left(\frac{2}{5}\right)^3$

$7x = 3$

$x = \frac{3}{7}$