

Students will ...Extend the properties of exponents to rational exponents. _____ / 30 points

True or False. Write the entire word. (1 point each)

- F 1. $3^{-2} = -9$ T 2. $2^4 \cdot 2^5 = 2^9$ T 3. $\frac{2}{x^{-3}} = 2x^3$
F 4. $\left(\frac{4}{a}\right)^{-1} = -4a$ F 5. $(a^9)^3 = a^{12}$ ~~F~~ 6. $\frac{x^2}{x^{-2}} = 1$

Rewrite using rational exponent notation. (1 point each)

7. $\sqrt{x^3} = x^{3/2}$ 8. $\sqrt[5]{2x^2y^4} = 2^{1/5} x^{2/5} y^{4/5}$

Rewrite the expression using simplified radical notation. (1 point each)

9. $x^{3/5} = \sqrt[5]{x^3}$ 10. $a^{2/3} b^{1/3} = \sqrt[3]{a^2 b}$

Evaluate each expression. (2 points each)

11. $27^{2/3} = ((3)^3)^{2/3} = 3^2 = 9$ 12. $\left(\frac{25}{64}\right)^{1/2} = \frac{5}{8}$ 13. $64^{-1/3} = \frac{1}{\sqrt[3]{64}} = \frac{1}{4}$ 14. $7^{1/4} \cdot 7^{7/4} = 7^{8/4} = 7^2 = 49$

Simplify each expression. Write each answer in the form of the original expression. (2 points each)

15. $\frac{\sqrt[4]{32x^5y^3}}{2x\sqrt[4]{2xy^3}}$

16. $\sqrt[6]{m^3} = m^{1/2} = \sqrt{m}$

17. $(x^3)^{5/12} = x^{15/12} = x^{5/4}$

18. $\sqrt[3]{x^2} \cdot \sqrt[3]{x} = \sqrt[3]{x^3} = x^{1/3} = \sqrt[3]{x}$

19. $\left(\frac{x^{-6}y^9}{27}\right)^{-1/3} = \frac{x^2y^{-3}}{27^{-1/3}} = \frac{3x^2}{y^3}$

20. $\frac{y^{4/4}}{y^4} = \frac{y^1}{y^4} = y^{-3} = \frac{1}{y^3}$

Key

Unit 1B: Test Review Part 1

Ways to solve an equation with an x^2 in it:

1) factoring

2) completing the square

3) quadratic formula
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solve each equation.

F 1. $x^2 - 5x = -6$

$$x^2 - 5x + 6 = 0$$

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

$$x-3=0 \quad x-2=0$$

$$\boxed{x=3 \quad x=2}$$

Q 2. $2x^2 + x = 6$

$$a=2 \quad b=+1 \quad c=-6$$

$$x = \frac{-1 \pm \sqrt{1 - 4(2)(-6)}}{4}$$

$$x = \frac{-1 \pm \sqrt{49}}{4}$$

$$x = \frac{-1 + 7}{4} = \frac{6}{4} = \frac{3}{2}$$
$$x = \frac{-1 - 7}{4} = \frac{-8}{4} = \boxed{-2}$$

F 3. $8x^2 + 18x = 5$

$$x^2 + 18x - 40 = 0$$

$$(x + \frac{20}{8})(x - \frac{2}{8}) = 0$$

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

$$(2x + 5)(4x - 1) = 0$$

$$2x + 5 = 0 \quad 4x - 1 = 0$$

$$\boxed{x = -\frac{5}{2} \quad x = \frac{1}{4}}$$

F 4. $48 - 3y^2 = 0$

$$3(16 - y^2) = 0$$

$$3(4 - y)(4 + y) = 0$$

$$4 - y = 0 \quad 4 + y = 0$$

$$\boxed{y = 4 \quad y = -4}$$

F 5. $a^2 + 16 = 25$

$$a^2 - 9 = 0$$

$$(a + 3)(a - 3) = 0$$

$$a + 3 = 0 \quad a - 3 = 0$$

$$\boxed{a = -3 \quad a = 3}$$

C 6. $3x^2 + 12x + 12 = 0$

$$3(x^2 + 4x + \underline{4}) = -4 + \underline{4}$$

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

$$x + 2 = 0$$

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

Q 7. $-2n^2 + 10 = -6$
 $2n^2 - 16 = 0$
 $a=2 \quad b=0 \quad c=-16$

$$x = \frac{\pm \sqrt{-4(2)(-16)}}{4} = \frac{\pm \sqrt{128}}{4}$$

$$= \pm \frac{8\sqrt{2}}{4} = \boxed{\pm 2\sqrt{2}}$$

$$\begin{array}{r} 4 \\ \overline{)16} \\ \underline{x8} \\ 128 \\ \underline{1} \\ 64 \\ \underline{88} \end{array}$$

S.R.8. $\sqrt{(2x+5)^2} = \sqrt{27}$

$$2x+5 = \pm 3\sqrt{3}$$

$$\frac{2x}{2} = \frac{-5 \pm 3\sqrt{3}}{2}$$

$$\boxed{x = \frac{-5 \pm 3\sqrt{3}}{2}}$$

S.R.9. $\sqrt{(4x-1)^2} = \sqrt{81}$

4x

$$4x-1 = \pm 9$$

$$4x = 1+9$$

$$x = \frac{10}{4} = \boxed{\frac{5}{2}}$$

$$4x = 1-9$$

$$4x = -8$$

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

S.R.10. $3(2x+3)^2 = 45$

$$\sqrt{(2x+3)^2} = \sqrt{15}$$

$$2x+3 = \pm \sqrt{15}$$

$$\frac{2x}{2} = \frac{-3 \pm \sqrt{15}}{2}$$

$$\boxed{x = \frac{-3 \pm \sqrt{15}}{2}}$$

C 11. $x^2 + 10x - 1 = 0$

$$x^2 + 10x + \frac{25}{4} = 1 + \frac{25}{4}$$

$$\sqrt{(x+5)^2} = \sqrt{26}$$

$$x+5 = \pm\sqrt{26}$$

$$\boxed{x = -5 \pm \sqrt{26}}$$

Q 12. $x^2 - 14x = 9$

$$x^2 - 14x - 9 = 0$$

$$a=1 \quad b=-14 \quad c=-9$$

$$x = \frac{14 \pm \sqrt{196 - 4(1)(-9)}}{2}$$

$$x = \frac{14 \pm \sqrt{232}}{2} = \frac{14 \pm 2\sqrt{58}}{2} = \boxed{7 \pm \sqrt{58}}$$

C 13. $x^2 - 10x = -41$

$$x^2 - 10x + 25 = -41 + 25$$

$$\sqrt{(x-5)^2} = \sqrt{-16}$$

$$x-5 = \pm 4i$$

$$\boxed{x = 5 \pm 4i}$$

C 14. $14x^2 + 28x = 9$

$$\frac{14x^2}{14} + \frac{28x}{14} = \frac{9}{14}$$

$$x^2 + 2x + \frac{1}{7} = \frac{9}{14} + \frac{1 \cdot 14}{1 \cdot 14}$$

$$(x+1)^2 = \frac{23}{14}$$

$$x = -1 \pm \frac{\sqrt{23}}{\sqrt{14}} \cdot \frac{\sqrt{14}}{\sqrt{14}}$$

$$\boxed{x = \frac{-1 \pm \sqrt{322}}{14}}$$

Q 15. $2x^2 + 32x - 10 = 6$

$$2x^2 + 32x - 16 = 0$$

$$2(x^2 + 16x - 8) = 0$$

$$a=1 \quad b=16 \quad c=-8$$

$$x = \frac{-16 \pm \sqrt{256 - 4(1)(-8)}}{2}$$

$$x = \frac{-16 \pm \sqrt{288}}{2}$$

$$x = \frac{-16 \pm 12\sqrt{2}}{2}$$

$$x = -8 \pm 6\sqrt{2}$$

Q 16. $4x^2 - 3x + 9 = 0$

$$a=4 \quad b=-3 \quad c=9$$

$$x = \frac{3 \pm \sqrt{9 - 4(4)(9)}}{8}$$

$$x = \frac{3 \pm \sqrt{-135}}{8}$$

$$x = \frac{3 \pm 3i\sqrt{15}}{8}$$

Q 17. $8x^2 + x - 1 = 0$

$$a=8 \quad b=1 \quad c=-1$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(8)(-1)}}{16}$$

$$x = \frac{-1 \pm \sqrt{33}}{16}$$

C 18. $3x^2 - 9x + 2 = 7$

$$\frac{3x^2 - 9x}{3} = \frac{5}{3}$$

$$\left(\frac{3}{2}\right)^2 x^2 - 3x + \frac{9}{4} = \frac{5}{3} + \frac{9}{4} \cdot 3$$

$$\sqrt{\left(x - \frac{3}{2}\right)^2} = \sqrt{\frac{47}{12}}$$

$$x = \frac{3}{2} \pm \frac{\sqrt{47}}{\sqrt{12}}$$

$$x = \frac{3}{2} \pm \frac{\sqrt{47}}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$x = \frac{3}{2} \pm \frac{\sqrt{141}}{6}$$

19. $12x^2 + 80x - 28 = 0$

$4(3x^2 + 20x - 7) = 0$

$x^2 + 20x - 21$
 $(x + \frac{21}{3})(x - 1)$

$x + 7 = 0$ $3x - 1 = 0$
 $x = -7$ $x = \frac{1}{3}$

$4(x+7)(3x-1) = 0$

S.R. 20. $5x^2 + 3 = x^2 + 51$

$4x^2 - 48 = 0$ $4x^2 = 48$

$4(x^2)$

$\frac{4}{4} \quad \frac{48}{4}$

$\sqrt{x^2} = \sqrt{12}$

$x = \pm 2\sqrt{3}$

S.R. 21. $x^2 = 6$

$\sqrt{x^2} = \sqrt{6}$

$x = \pm\sqrt{6}$

F 22. $4x^2 - 36x = 0$

$4x(x-9) = 0$

$4x = 0$ $x - 9 = 0$

$x = 0$ $x = 9$