Algebra 2 Name Key

Exponent Properties w/ Fractional Exponents

Hour____

Simplify. Your answer should contain only positive exponents.

1) $2x^{\frac{2}{2}} \cdot yx^{\frac{3}{2}}$

$2x^{\frac{5}{2}}y^{2}$

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

$6x^{\frac{5}{3}}$

3) $3mn^{\frac{4}{3}} \cdot 3mn^{\frac{2}{1}\cdot\frac{3}{3}=\frac{6}{3}}$

$9m^{2}n^{\frac{10}{3}}$

4) $\left(x^{\frac{1}{2}}\right)^{-2}$

$x^{-1} = \frac{1}{x}$

5) $\left(x^{\frac{3}{2}}y^{-3}\right)^{-\frac{2}{3}}$

$x^{-1}y^{2} = \frac{y^{2}}{x}$

6) $\left(yx^{\frac{2}{3}}\right)^{\frac{1}{2}}$

$x^{\frac{1}{3}}y^{\frac{1}{2}}$

7) $\dfrac{yx^{\frac{3}{3}\frac{3}{2}}}{3x^{-\frac{3}{2}}y^{\frac{2}{3}}}$ $\dfrac{x^{\frac{6}{2}}y^{\frac{1}{3}}}{3} = \dfrac{x^{3}y^{\frac{1}{3}}}{3}$

8) $\dfrac{3m^{\frac{2}{3}}n^{\frac{3}{2}}}{3m^{-\frac{1}{3}}n^{-1^{-\frac{2}{2}}}}$ $mn^{\frac{5}{2}}$

9) $\dfrac{b^{\frac{4}{3}\frac{8}{6}}}{a^{-1}b^{\frac{1}{2}\frac{3}{6}}}$ $ab^{\frac{5}{6}}$

10) $xy^{3^{\frac{6}{2}}} \cdot x^{-2}y^{-\frac{1}{2}} \cdot \left(yx^{\frac{2}{1}}\right)^{\frac{2}{3}}$

$x^{-\frac{3}{3}}y^{\frac{5}{2}\frac{15}{6}} \cdot y^{\frac{2}{3}\frac{4}{6}} \cdot x^{\frac{4}{3}}$

$x^{\frac{1}{3}}y^{\frac{19}{6}}$

11) $(xy^2)^{\frac{5}{3}} \cdot x^{\frac{5}{3}}y^{-1}$

$x^{\frac{5}{3}}y^{\frac{10}{3}} \cdot x^{\frac{5}{3}}y^{-\frac{3}{3}}$

$\boxed{x^{\frac{10}{3}}y^{\frac{7}{3}}}$

12) $xy^2 \cdot x^{-1} \cdot y$

$\boxed{y^3}$

13) $\dfrac{3x^{\frac{1}{2}}y^{\frac{5}{3}}}{xy^{\frac{1}{3}} \cdot 3yx^{-\frac{5}{3}}}$ $\quad \dfrac{3x^{\frac{3}{6}}y^{\frac{5}{3}}}{3x^{\frac{6}{6}}x^{-\frac{10}{6}}y^{\frac{1}{3}}y^{\frac{3}{3}}}$

$\dfrac{3x^{\frac{3}{6}}y^{\frac{5}{3}}}{3x^{-\frac{4}{6}}y^{\frac{4}{3}}} = \boxed{x^{\frac{7}{6}}y^{\frac{1}{3}}}$

14) $\dfrac{x^2}{\left(x^{\frac{1}{2}}y^{\frac{2}{3}}\right)^{-\frac{1}{2}}}$ $\quad \dfrac{x^{\frac{8}{4}}}{x^{-\frac{1}{4}}y^{-\frac{2}{6}}} = \boxed{x^{\frac{9}{4}}y^{\frac{1}{3}}}$

15) $\dfrac{\left(u^{\frac{5}{3}}v^{\frac{3}{2}}\right)^{\frac{5}{3}}}{u^{-\frac{1}{2}}}$ $\quad \dfrac{u^{\frac{25}{9}}v^{\frac{15}{6}}}{u^{-\frac{1}{2}}} = \dfrac{u^{\frac{50}{18}}v^{\frac{15}{6}}}{u^{-\frac{9}{18}}}$

$\boxed{u^{\frac{59}{18}}v^{\frac{5}{2}}}$

16) $\left(\dfrac{u^{\frac{3}{2}}}{u^{-\frac{2}{3}}v^{-1}}\right)^2$ $\quad \dfrac{u^{\frac{3}{1}}}{u^{-\frac{4}{3}}v^{-2}} = \dfrac{u^{\frac{9}{3}}v^2}{u^{-\frac{4}{3}}}$

$\boxed{u^{\frac{13}{3}}v^2}$

17) $\dfrac{xy^{-\frac{1}{3}} \cdot x^{-1}y^2}{\left(x^{-\frac{5}{3}}\right)^{\frac{1}{2}}}$ $\quad \dfrac{x^{\frac{2}{2}}y^{-\frac{2}{6}}x^{-\frac{2}{2}}y^{\frac{12}{6}}}{x^{-\frac{5}{6}}}$

$x^{\frac{5}{6}}y^{\frac{10}{6}} = \boxed{x^{\frac{5}{6}}y^{\frac{5}{3}}}$

18) $\dfrac{\left(x^{\frac{4}{3}}y^{\frac{4}{3}}\right)^2 \cdot xy^2}{x^{-\frac{4}{3}}y^{-1}}$ $\quad \dfrac{x^{\frac{8}{3}}y^{\frac{8}{3}} \cdot x^{\frac{3}{3}}y^{\frac{6}{3}}}{x^{-\frac{4}{3}}y^{-\frac{3}{3}}}$

$\dfrac{x^{\frac{15}{3}}y^{\frac{14}{3}}}{x^{-\frac{4}{3}}y^{-\frac{3}{3}}} = x^{\frac{15}{3}}y^{\frac{17}{3}} = \boxed{x^5y^{\frac{17}{3}}}$

Factor each and find all zeros. One zero has been given.

19) $f(x) = x^3 + 6x^2 - x - 30$; -5

$-5 \mid 1 \quad 6 \quad -1 \quad -30$

$\quad\quad -5 \quad -5 \quad 30$

$\quad 1 \quad 1 \quad -6 \quad 0$

$x^2 + x - 6 = 0$

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

$\boxed{f(x) = (x+5)(x+3)(x-2)}$

$\boxed{x = -5, -3, 2}$

20) $f(x) = x^3 + 4x^2 - 3x - 18$; -3

$-3 \mid 1 \quad 4 \quad -3 \quad -18$

$\quad\quad -3 \quad -3 \quad 18$

$\quad 1 \quad 1 \quad -6 \quad 0$

$x^2 + x - 6 = 0$

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

$\boxed{f(x) = (x+3)(x+3)(x-2)}$

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