Algebra 2 - Unit 4

Name Key

# Unit 4 Review

Date _____ Period ____

**Simplify. Your answer should contain only positive exponents.**

1) $2xzy^{-3} \cdot xzy^3 \cdot 3x^4y^2z^4$

$= 6x^{1+1+4}y^{-3+3+2}z^{1+1+4}$

$= \boxed{6x^6y^2z^6}$

2) $3x^{-2}y^4z^3 \cdot yx^2z^{-2}$

$= 3x^{-2+2}y^{4+1}z^{3-2}$

$= \boxed{3y^5z}$

3) $(2x^3y^{-4}z^4)^{-3}$

$= 2^{-3}x^{3\cdot-3}y^{-4\cdot-3}z^{4\cdot-3}$

$= \frac{1}{2^3}x^{-9}y^{12}z^{-12} = \boxed{\frac{y^{12}}{8x^9z^{12}}}$

4) $(4p^2q^4r^3)^2$

$= 4^2p^{2\cdot2}q^{4\cdot2}r^{3\cdot2}$

$= \boxed{16p^4q^8r^6}$

5) $\frac{4p^{-3}q^{-4}}{4pm^4q^{-1}}$

$= p^{-3-1}m^{-4}q^{-4-1}$

$= p^{-4}m^{-4}q^{-3}$

$= \boxed{\frac{1}{p^4m^4q^3}}$

6) $\frac{xy^3z^4}{x^{-4}y^3z^{-3}}$

$= x^{1-4}y^{3-3}z^{4-3}$

$= \boxed{x^5z^7}$

7) $m^4p^{-1}q^2 \cdot (2m^3p^{-4}q^{-4})^{-2}$

$= m^4p^{-1}q^2 \cdot 2^{-2}m^{3\cdot-2}p^{-4\cdot-2}q^{-4\cdot-2}$

$= m^4p^{-1}q^2 \cdot \frac{1}{2^2}m^{-6}p^8q^8$

$= m^{4+-6}p^{-1+8}q^{2+8} \cdot \frac{1}{4}$

$= m^{-2}p^7q^{10} \cdot \frac{1}{4} = \boxed{\frac{p^7q^{10}}{4m^2}}$

8) $(pm^{-3}q^4)^3 \cdot qm^3p^2$

$= p^3m^{-3\cdot3}q^{4\cdot3} \cdot qm^3p^2$

$= p^3m^{-9}q^{12} \cdot qm^3p^2$

$= p^{3+2}m^{-9+3}q^{12+1}$

$= p^5m^{-6}q^{13} = \boxed{\frac{p^5q^{13}}{m^6}}$

9) $\frac{2kh^{-1} \cdot 3j^4k^{-3} \cdot 3h^{-4}j^{-4}k^{-4}}{h^4j^{-1}}$

$= \frac{18k^{1+-3+-4}h^{-1+-4}j^{4+-4}}{h^4j^{-1}}$

$= \frac{18k^{-6}h^{-5}j^0}{h^4j^{-1}}$

$= 18k^{-6}h^{-5-4}j^{0-1} = \boxed{\frac{18j}{k^6h^9}}$

10) $\frac{4ac^4}{3a^{-3}b^2c^4 \cdot 4a^4b^2c^3}$

$= \frac{4ac^4}{12a^{-3+4}b^{2+2}c^{4+3}}$

$= \frac{4ac^4}{12a^1b^4c^7}$

$= \frac{1}{12}a^{1-1}b^{-4}c^{4-7} = \frac{\frac{4}{\div4}}{\frac{12b^4c^3}{\div4}} = \boxed{\frac{1}{3b^4c^3}}$

11) $\dfrac{2x^2z^2}{(x^{-4}y^3z^{-2})^3}$

$= \dfrac{2x^2z^2}{x^{-4\cdot3}y^{3\cdot3}z^{-2\cdot3}} = \dfrac{2x^2z^2}{x^{-12}y^9z^{-6}} = 2x^{2-(-12)}y^{-9}z^{2-(-6)}$

$= 2x^{14}y^{-9}z^8 = \boxed{\dfrac{2x^{14}z^8}{y^9}}$

12) $\left(\dfrac{a^3b^4c^{-4}}{a^{-3}b^{-3}c^2}\right)^2 = \left(a^{3-(-3)}b^{4-(-3)}c^{-4-2}\right)^2$

$= (a^6b^7c^{-6})^2 = a^{12}b^{14}c^{-12}$

$= \boxed{\dfrac{a^{12}b^{14}}{c^{12}}}$

**Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.**

13) $3x^{-\frac{2}{3}} \cdot x^{\frac{1}{2}}y^{\frac{1}{2}}z^{\frac{3}{2}} \cdot 3x^{-\frac{3}{2}}y^{-\frac{3}{2}}$

$= 9x^{-\frac{2}{3}+\frac{1}{2}+\frac{-3}{2}}y^{\frac{1}{2}+\frac{-3}{2}}z^{\frac{3}{2}}$

$= 9x^{\frac{-4}{6}+\frac{3}{6}+\frac{-9}{6}}y^{-\frac{2}{2}}z^{\frac{3}{2}}$

$= 9x^{-\frac{10}{6}}y^{-1}z^{\frac{3}{2}} = \boxed{\dfrac{9z^{3/2}}{x^{5/3}y}}$

14) $\left(y^{\frac{7}{4}}z^{\frac{5}{4}}\right)^{\frac{5}{3}} = y^{\frac{7}{4}\cdot\frac{5}{3}}z^{\frac{5}{4}\cdot\frac{5}{3}}$

$= \boxed{y^{\frac{35}{12}}z^{\frac{25}{12}}}$

15) $\dfrac{2x^{\frac{3}{4}}y^{\frac{3}{4}}z^{\frac{3}{4}}}{3x^{-\frac{4}{3}}y^{\frac{5}{4}}z^3}$

$= \dfrac{2}{3}x^{\frac{3}{4}-\frac{-4}{3}}y^{\frac{3}{4}-\frac{5}{4}}z^{\frac{3}{4}-3} = \dfrac{2}{3}x^{\frac{9}{12}+\frac{16}{12}}y^{-\frac{2}{4}}z^{\frac{3}{4}-\frac{12}{4}}$

$= \boxed{\dfrac{2x^{\frac{25}{12}}}{3y^{\frac{1}{2}}z^{9/4}}}$

**Simplify.**

16) $-3\sqrt{8}$

$= -3\sqrt{4\cdot2}$

$= -3\cdot2\sqrt{2}$

$= \boxed{-6\sqrt{2}}$

17) $3\sqrt{144}$

$= 3\cdot12$

$= \boxed{36}$

18) $-3\sqrt{144}$

$= -3\cdot12$

$= \boxed{-36}$

19) $-3\sqrt{96}$

$= -3\cdot\sqrt{16\cdot6}$

$= -3\cdot4\sqrt{6}$

$= \boxed{-12\sqrt{6}}$

20) $-6\sqrt{216x^{10}y^{14}z^{8}}$

$= -6\sqrt{36 \cdot 6}$

$= -6 \cdot 6\sqrt{6}$

$= \boxed{-36x^5y^7z^4\sqrt{6}}$

21) $-5\sqrt{216x^{11}y^3z^{15}}$

$= -5\sqrt{36 \cdot 6}$

$= -5 \cdot 6\sqrt{6}$

$= -30\sqrt{6} \rightarrow \boxed{-30x^5yz^7\sqrt{6xyz}}$

22) $-4\sqrt{63a^9b^2c^{17}}$

$= -4\sqrt{9 \cdot 7}$

$= -4 \cdot 3\sqrt{7}$

$= -12\sqrt{7} \rightarrow \boxed{-12a^4bc^8\sqrt{7ac}}$

23) $-8\sqrt{18p^{12}q^5r^3}$

$= -8\sqrt{9 \cdot 2}$

$= -8 \cdot 3\sqrt{2}$

$= -24\sqrt{2} \rightarrow \boxed{-24p^6q^2r\sqrt{2qr}}$

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

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

25) $-2\sqrt{6} - 3\sqrt{6} - 2\sqrt{6} - 3\sqrt{6}$

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

26) $-2\sqrt{3} - \sqrt{5} + 2\sqrt{2} - 3\sqrt{5}$

$= \boxed{-4\sqrt{5} - 2\sqrt{3} + 2\sqrt{2}}$

27) $-\sqrt{12} + 3\sqrt{6} - 2\sqrt{54} - 3\sqrt{12}$

$= -\sqrt{4 \cdot 3} + 3\sqrt{6} - 2\sqrt{9 \cdot 6} - 3\sqrt{4 \cdot 3}$

$= -2\sqrt{3} + 3\sqrt{6} - 2 \cdot 3\sqrt{6} - 3 \cdot 2\sqrt{3}$

$= -2\sqrt{3} + 3\sqrt{6} - 6\sqrt{6} - 6\sqrt{3}$

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

28) $2\sqrt{27} - \sqrt{3} - 2\sqrt{18} + 3\sqrt{20}$

$= 2\sqrt{9 \cdot 3} - \sqrt{3} - 2\sqrt{9 \cdot 2} + 3\sqrt{4 \cdot 5}$

$= 2 \cdot 3\sqrt{3} - \sqrt{3} - 2 \cdot 3\sqrt{2} + 3 \cdot 2\sqrt{5}$

$= 6\sqrt{3} - \sqrt{3} - 6\sqrt{2} + 6\sqrt{5}$

$= \boxed{5\sqrt{3} - 6\sqrt{2} + 6\sqrt{5}}$

29) $-2\sqrt{2} - 3\sqrt{45} + 3\sqrt{24} + 3\sqrt{5}$

$= -2\sqrt{2} - 3\sqrt{9 \cdot 5} + 3\sqrt{4 \cdot 6} + 3\sqrt{5}$

$= -2\sqrt{2} - 3 \cdot 3\sqrt{5} + 3 \cdot 2\sqrt{6} + 3\sqrt{5}$

$= -2\sqrt{2} - 9\sqrt{5} + 6\sqrt{6} + 3\sqrt{5}$

$= \boxed{-2\sqrt{2} - 6\sqrt{5} + 6\sqrt{6}}$