2.2 Exponent Review and Rational Exponents 2019-20
(1.1.1, 1.1.2)

Simplify each expression. Your answers should contain only positive exponents.

1. $2n^4 \cdot n^3$

2. $3^5 \cdot 3^{-3}$

3. $\dfrac{3q^{10}}{q^8}$

4. $\dfrac{5t^{-6}}{20t^{-3}}$

5. $\left(u^2\right)^7$

6. $\left(v^{-3}\right)^7$

7. $\left(w^{-4}\right)^{-1}$

8. $8x^{-2} \cdot 4x$

9. $\dfrac{4b^2}{6c^2b^{-2}}$

10. $7p^{-3}q^{-4}r^{-1} \cdot 2p^3q^{-4}r^{-2}$

11. $\left(2m^2\right)^3 \cdot 7nm^4$

12. $\dfrac{2t}{tuv^{-3}}$

13. $\left(5xy^{-2}z^3\right)^4$

14. $\left(4c^3d^{-4}\right)^{-4}$

15. $h^2k^{11} \cdot \left(h^{-3}k^7\right)^{-5}$

16. $\dfrac{2pq^{-5}}{\left(2q^2\right)^3}$

17. $\left(\dfrac{uv^3}{3u^2v^{-1}}\right)^{-2}$

18. $\dfrac{2g^{-2}h^2k^4}{\left(g^4h^4k^4\right)^{-3}}$

19. $\left(\dfrac{m^4 n^{-3}}{n^{-5}}\right)^{-2} \cdot \dfrac{\left(m^7 n\right)^5}{n^2}$

20. $\dfrac{2r^{-4}t^3 \cdot \left(r^3\right)^3}{6tr^{-3}}$

21. $\dfrac{\left(6x^4 y^{-3} z^{-2}\right)^{-2}}{x^{-1} y^4 z^{-3} \cdot \left(x^2 z^2\right)^3}$

22. In your own words, explain what a negative exponent means

23. In your own words, explain why $x^0 = 1$.

Write an equivalent expression using radical notation.

24. $y^{1/3}$

25. $\left(a^2 b^2\right)^{1/5}$

26. $4x^{1/4}$

27. $t^{5/6}$

28. $16^{3/4}$

29. $27^{4/3}$

Write an equivalent expression using rational exponents.

30. $\sqrt[5]{pq}$

31. $\sqrt[4]{10v}$

32. $3\sqrt{z}$

33. $4\sqrt[3]{x^2}$

34. $\sqrt[5]{(3n)^4}$

35. $\left(\sqrt[6]{2a^5 b}\right)^7$

Write an equivalent expression using positive exponents and, if possible, simplify.

36. $9^{-1/2}$

37. $27^{-2/3}$

38. $5(xy)^{-4/5}$

Use the laws of exponents to simplify. Final answer should be in rational exponent form using only positive exponents.

39. $3^{1/7} \cdot 3^{4/7}$

40. $y^{5/4} \cdot y^{-3/4}$

41. $x^{4/5} \cdot x^{7/10}$

42. $\dfrac{m^{7/8}}{m^{3/8}}$

43. $\dfrac{c^{1/2}}{c^{3/4}}$

44. $\dfrac{p}{p^{1/3}}$

45. $\left(h^{2/3}\right)^{3/4}$

46. $\left(n^{-1/6}\right)^{2/3}$

47. $\left(k^{-7/3}\right)^{-6/5}$

48. $\left(2t^{1/4}\right)^{2} \cdot t^{3/4}$

49. $\left(v^{-1/3}w^{2/5}\right)^{1/2}$

50. $\left(\dfrac{x^{1/3}}{y^{-4/9}z^{5/6}}\right)^{3}$

Use rational exponents to simplify. Write your final answer in radical form.

51. $\sqrt[9]{q^3}$

52. $\sqrt[4]{a^{18}}$

53. $\left(\sqrt[7]{x^2 y}\right)^{14}$

54. $\sqrt{r}\cdot\sqrt[5]{r^2}$

55. $\dfrac{\sqrt[3]{s}}{\sqrt[4]{s}}$

56. $\sqrt{\sqrt[3]{z}}$

Review
Find the prime factorization (use a factor tree) for each of the following.

57. 120

58. 72

59. List the transformations to $h(x) = -\sqrt{x+1} - 5$ in the correct order.

60. If $f(x) = -2x^2 - 3x + 5$, find $f(-3)$.