

Practice B

- | | |
|--------------|--------------|
| 1. 3 | 2. 11 |
| 3. 0 | 4. 11 |
| 5. 4 | 6. 8 |
| 7. 8 | 8. 125 |
| 9. 8 | 10. 8 |
| 11. 1 | 12. 1331 |
| 13. y | 14. x^2y^6 |
| 15. a^2b | 16. x^5 |
| 17. x^2y^4 | 18. x |
| 19. $20m$ | |

Jan 29-8:26 AM

$$2n^{-2} = \frac{2}{\cancel{n^2}} = \frac{2}{n^2}$$

$$-\frac{3x^2}{y^{-2}} = \frac{x^2y^2}{3}$$

$$\frac{2x^{-2}}{y^3} = \frac{2y^3}{x^2}$$

Jan 29-9:17 AM

$$1. (4a^5)^3 \quad \begin{array}{l} 4^3 a^{15} \\ 64a^{15} \end{array}$$

$$4. (x^5)^2$$

$$7. x^4 \cdot (x^4)^3$$

$x^4 \cdot x^{12} = x^{16}$

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$$10. (a^4)^{-5} \cdot a^{13}$$

$a^{-20} \cdot a^{13} = a^{-20+13} \quad a^{-7} \quad \frac{1}{a^7}$

$$13. (d^2)^{-4}$$

$$16. (12b^{-2})^2$$

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$$19. (y^6)^{-3} \cdot y^{21}$$

$$y^{-18} \cdot y^{21} = y^{-18+21} = y^3$$

$$22. (a^3)^6$$

$$25. (5a^3b^5)^4$$

$$5^4 a^{12} b^{20}$$

$$625 a^{12} b^{20}$$

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$$28. a^{-4} \cdot (a^4 b^3)^2$$

$$a^{-4} \cdot a^8 b^6$$

$$\begin{array}{r} a^{-4+8} \\ a^4 \end{array} \begin{array}{r} b^6 \\ b^6 \end{array}$$

$$\begin{array}{r} a^4 \\ a^8 \\ \hline a^4 \end{array} \begin{array}{r} b^6 \\ b^6 \\ \hline b^6 \end{array}$$

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$$11. (3f^4g^{-3})^3(f^2g^{-2})^{-1}$$

$$14. (a^3b^4)^{-2}(a^{-3}b^{-5})^{-4}$$

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$$3. (m^{-3}n^4)^{-4}$$

$$6. (4x^4)^3(2xy^3)^2$$

$$9. (5^2)^2$$

5^4

$$\begin{array}{l} 2^2 x^2 y^6 \\ \hline 4^3 x^{12} \\ \hline 64 x^{12} y^6 \\ \hline 5^2 y^2 \\ \hline 25 y^6 \end{array}$$

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$$12. x^3 \cdot (x^3)^5$$

$$15. (x^2y)^4$$

$$18. (x^{-4})^5(x^3y^2)^5$$

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$$21. (m^5)^{-3}(m^4n^5)^4$$

$$24. (4^{-1} s^3)^{-2}$$

$4^{-1(-2)} \quad s^{3(-2)} \quad 4^2 s^{-6} = 16s^{-6} = \frac{16}{s^6}$

$$27. (y^6)^3$$

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$$30. d^3 \cdot (d^2)^5$$

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$$31. 10^{-9} \cdot (2 \times 10^2)^2$$

$(1 \times 10^{-9}) (4 \times 10^4) = (4 \times 10^{-5})$

$$34. (9 \times 10^7)^2$$

$$37. (5 \times 10^5)^4$$

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40. $(3 \times 10^5)^4$

43. $10^5 \cdot (8 \times 10^7)^3$

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33. $10^4 \cdot (4 \times 10^6)^3$

36. $(7 \times 10^5)^3$

39. $(5 \times 10^2)^{-3}$

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$$42. (1 \times 10^{-5})^{-5}$$

$$45. 10^7 \cdot (2 \times 10^2)^4$$

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46. The kinetic energy, in joules, of a moving object is found by using the formula $E = \frac{1}{2}mv^2$, where m is the mass and v is the speed of the object. The mass of a car is 1.59×10^3 kg. The car is traveling at 2.7×10^1 m/s. What is the kinetic energy of the car?

$$\begin{aligned}
 E &= \frac{1}{2} (1.59 \times 10^3) (2.7 \times 10^1)^2 \\
 &= \frac{1}{2} (1.59 \times 10^3) (7.29 \times 10^2) \\
 &= (11.59 \times 10^3) \\
 &= \frac{1}{2} (1.16 \times 10^9)
 \end{aligned}$$

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47. The moon is shaped somewhat like a sphere. The surface area of the moon is found by using the formula $S = 12.56r^2$. What is the surface area of the moon if the radius is 1.08×10^3 mi?

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48. Because of a record corn harvest, excess corn is stored on the ground in a pile. The pile is shaped like a cone. The height of the pile is 25 ft, and the radius of the pile is 1.2×10^2 ft. Use the formula $V = \frac{1}{3}\pi r^2 h$ to find the volume.

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49. Suppose the distance in feet that an object travels in t seconds is given by the formula $d = 64t^2$. How far would the object travel after 1.5×10^3 seconds?

Jan 29-8:14 AM

Practice 8-4

1. $64a^{15}$ 2. $\frac{1}{2^{12}}$ 3. $\frac{m^{12}}{n^{16}}$ 4. x^{10} 5. 2^{13} 6. $256x^{14}y^6$
7. x^{16} 8. $x^{17}y^{19}$ 9. 5^4 10. $\frac{1}{a^7}$ 11. $\frac{27f^{10}}{g^7}$ 12. x^{18}
13. $\frac{1}{d^8}$ 14. a^6b^{12} 15. x^8y^4 16. $\frac{144}{b^4}$ 17. m^{15} 18. $\frac{y^{10}}{x^5}$
19. y^3 20. $\frac{1}{n^4}$ 21. mn^{20} 22. a^{18} 23. $\frac{1}{b}$ 24. $\frac{16}{s^6}$
25. $625a^{12}b^{20}$ 26. $\frac{1}{b^{18}}$ 27. y^{18} 28. a^4b^6 29. $x^{12}y^3$
30. d^{13} 31. 4×10^{-5} 32. 2.7×10^{-17} 33. 6.4×10^{23}
34. 8.1×10^{15} 35. 3.2×10^{13} 36. 3.43×10^{17}
37. 6.25×10^{22} 38. 8×10^{-9} 39. 8×10^{-9}
40. 8.1×10^{21} 41. 1.5625×10^{-26} 42. 1×10^{25}
43. 5.12×10^{28} 44. 2.16×10^{-1} 45. 1.6×10^{16}
46. $5.79555 \times 10^5 \text{ J}$ 47. $1.46 \times 10^7 \text{ mi}^2$
48. $3.8 \times 10^5 \text{ ft}^3$ 49. $1.44 \times 10^8 \text{ ft}$

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Practice 8-5

Jan 29-8:15 AM

2.

$$\left(\frac{x^3 y^{-2}}{z^{-5}} \right)^{-4}$$

$$\left(\frac{x^3}{z^5} y^2 \right)^{-4}$$

$$\frac{y^2}{x^3 z^5}^4$$

$$\frac{y^8}{x^{12} z^{20}}$$

$$\left(\frac{x^{-12} y^8}{z^{20}} \right)$$

$$\frac{y^8}{x^{12} z^{20}}$$

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4. $\left(\frac{a^2}{b^3}\right)^5$

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6. $\left(\frac{a^3}{b^2}\right)^4$

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$$8. \left(\frac{p^{-3}q^{-2}}{q^{-3}r^5} \right)^4$$

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$$10. \frac{7^{-4}}{7^{-7}} \rightarrow \frac{7^{\cancel{4}}}{7^{\cancel{4}}} = 7^3$$

$$7^{-4--7}$$

$$7^{-4+7}$$

$$7^3$$

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$$12. \left(\frac{a^2 b^{-4}}{b^2} \right)^5 = \frac{a^{10} b^{-20}}{b^{10}} = b^{-20+10}$$

$\left(\frac{a^2}{b^4 b^2} \right)^5$
 $\left(\frac{a^2}{b^6} \right)^5 = \frac{a^{10}}{b^{30}}$

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$$14. \frac{z^7}{z^{-3}}$$

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$$16. \frac{x^4 y^{-8} z^{-2}}{x^{-1} y^6 z^{-10}}$$

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$$18. \left(\frac{2^3 m^4 n^{-1}}{p^2} \right)^0$$

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$$20. \left(\frac{2a^3b^{-2}}{c^3} \right)^5$$

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$$22. \frac{h^{-13}}{h^{-8}}$$

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$$24. \left(\frac{1}{3}\right)^3$$

$$\frac{1^3}{3^3} = \frac{1}{9}$$

1-30

24-30
even only

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$$26. \left(\frac{m^{-3}n^4}{n^{-2}}\right)^4$$

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$$28. \left(\frac{a^8 b^6}{a^{11}} \right)^5$$

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$$30. \left(\frac{r^3 s^{-1}}{r^2 s^6} \right)^{-1}$$

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$$32. \quad \frac{m^8 n^3}{m^{10} n^5}$$

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$$34. \quad \frac{9.35 \times 10^{-3}}{3.71 \times 10^{-5}}$$

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$$36. \quad \frac{8 \times 10^9}{4 \times 10^5}$$

Jan 29-8:18 AM

$$38. \quad \frac{6.4 \times 10^9}{8 \times 10^7}$$

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$$40. \frac{1.8 \times 10^{-8}}{0.9 \times 10^3}$$

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$$42. \frac{8.19 \times 10^7}{4.76 \times 10^{-2}}$$

Jan 29-8:19 AM

$$44. \quad \frac{4.9 \times 10^{12}}{7 \times 10^3}$$

Jan 29-8:19 AM

$$46. \quad \frac{3.9 \times 10^3}{1.3 \times 10^8}$$

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48. $\frac{40 \text{ million}}{985 \text{ million}}$

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49. The half-life of uranium-238 is 4.5×10^9 years. The half-life of uranium-234 is 2.5×10^5 years. How many times greater is the half-life of uranium-238 than that of uranium-234.

Jan 29-8:19 AM

Practice 8-5

1. c^6 2. $\frac{y^8}{x^{12}z^{20}}$ 3. $\frac{x^3y^2}{z^5}$ 4. $\frac{a^{10}}{b^{15}}$ 5. 27 6. $\frac{a^{12}}{b^8}$ 7. $\frac{9}{4}$
8. $\frac{q^4}{p^{12}r^{20}}$ 9. $\frac{a^8}{b^{12}}$ 10. 343 11. a^2b^5 12. $\frac{a^{10}}{b^{30}}$ 13. $\frac{64}{9}$
14. z^{10} 15. $25b^8c^6$ 16. $\frac{x^5z^8}{y^{14}}$ 17. $\frac{1}{m^4}$ 18. 1 19. $\frac{s^8}{t^2}$
20. $\frac{32a^{15}}{b^{10}c^{15}}$ 21. $\frac{x^8}{y^2z^8}$ 22. $\frac{1}{h^5}$ 23. $\frac{1}{16}$ 24. $\frac{1}{27}$ 25. $\frac{x^3}{y^6}$
26. $\frac{n^{24}}{m^{12}}$ 27. $\frac{1}{64}$ 28. $\frac{b^{30}}{a^{15}}$ 29. $\frac{1}{n^6}$ 30. $\frac{s^7}{r}$ 31. $\frac{1}{n^{12}}$
32. $\frac{1}{m^2n^2}$ 33. 5.76×10^{-5} 34. 2.52×10^2
35. 2.07×10^4 36. 2×10^4 37. 1.9×10^{-3}
38. 8×10^1 39. 6.08×10^3 40. 2×10^{-11}
41. 4×10^8 42. 1.72×10^9 43. 3.33×10^{-3}
44. 7×10^8 45. 3.68×10^2 46. 3×10^{-5}
47. 7×10^1 48. 4.06×10^{-2} 49. 1.8×10^4 times longer

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