Indicate the answer choice that best completes the statement or answers the question.

Write each fraction as a decimal.

___ 1. $\frac{4}{25}$

a. 0.16 b. 0.84
c. 0.425 d. 6.25

___ 2. $-\frac{11}{40}$

a. $-3.\overline{6363}$ b. –0.1140
c. 0.275 d. –0.275

Write each mixed number as a decimal.

___ 3. $2\frac{2}{5}$

a. $0.41\overline{6}$ b. –2.4
c. 0.125 d. 2.4

Write each decimal as a fraction in simplest form.

___ 4. 0.5

a. $\frac{11}{20}$ b. $\frac{1}{2}$
c. $-\frac{1}{2}$ d. $\frac{9}{20}$

___ 5. –0.15

a. $-\frac{3}{20}$ b. $-\frac{1}{10}$
c. $\frac{3}{20}$ d. $-\frac{1}{5}$

Write each expression using exponents.

___ 6. $7 \cdot 7 \cdot 7 \cdot 7$

a. 7^{-4} b. 4^7
c. 7^3 d. 7^4

___ 7. $8 \cdot 5 \cdot 5 \cdot 5 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 5$

a. $5^4 \cdot 8^7$ b. $5^{-4} \cdot 8^{-7}$
c. $5^3 \cdot 8^6$ d. $4^5 \cdot 7^8$

___ 8. $7 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 7 \cdot 7 \cdot 7 \cdot 2$

a. $2^{-6} \cdot 7^{-4}$ b. $6^2 \cdot 4^7$
c. $2^6 \cdot 7^4$ d. $2^5 \cdot 7^3$

___ 9. $\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)$

a. $\left(\frac{1}{4}\right)^6$ b. $(6)^{\frac{1}{4}}$
c. $\left(\frac{1}{4}\right) + 6$ d. $\left(\frac{1}{4}\right) \cdot 6$

___ 10. $\left(-\frac{14}{17}\right)\left(-\frac{14}{17}\right)\left(-\frac{14}{17}\right)\left(-\frac{14}{17}\right)\left(-\frac{14}{17}\right)\left(-\frac{14}{17}\right)$

a. $\left(-\frac{14}{17}\right) \times 6$ b. $(6)^{-\frac{14}{17}}$
c. $\left(-\frac{14}{17}\right)^6$ d. $\left(-\frac{14}{17}\right) + 6$

Multiply. Express using exponents.

___ 11. $8^7 \cdot 8^6$

a. 8^1 b. 8^{42}
c. 8^{13} d. 1^{13}

___ 12. $(4m^4)(-7m^6)$

a. $-7m^{10}$ b. $-28m^{10}$
c. $-28m^2$ d. $4m^{24}$

___ 13. $\frac{3^{18}}{3^2} =$

a. 3^{36} b. 3^{16}
c. 3^{20} d. 3^9

___ 14. $\frac{-9x^{-8}}{-3x^{-3}} =$

a. $-6x^{-11}$ b. $-6x^{-5}$
c. $3x^{-5}$ d. $3x^{-11}$

___ 15. $\frac{4x^4}{-2x^{10}} =$

a. $6x^{-6}$ b. $-2x^{14}$
c. $6x^{14}$ d. $-2x^{-6}$

___ 16. $(n^5)^8 =$

a. n^{13} b. $5n^8$
c. n^{40} d. n^{58}

___ 17. $(3p^9)^2 =$

a. $9p^{11}$ b. $9p^{18}$
c. $3p^{11}$ d. $3p^{18}$

Write each expression using a negative exponent.

___ 18. $\frac{1}{8^3}$

a. $-\frac{1}{8^3}$ b. -8^3
c. $\frac{1}{8^{-3}}$ d. 8^{-3}

___ 19. $\frac{1}{5^4}$

a. $-\frac{1}{5^4}$ b. $\frac{1}{5^{-4}}$
c. 5^{-4} d. -5^4

___ 20. $\frac{1}{9}$

a. $\frac{1}{3^{-2}}$ b. -3^2
c. $\frac{1}{-3^2}$ d. 3^{-2}

Evaluate each expression.

___ 21. 3^{-4}

a. $\frac{1}{81}$ b. $\frac{1}{12}$
c. 12 d. 81

___ 22. $(-5)^{-3}$

a. –15 b. –125

c. $-\frac{1}{15}$ d. $-\frac{1}{125}$

Write each number in standard form.

___ 23. 6.14×10^2

a. 61.4 b. 0.0614

c. 0.00614 d. 614

___ 24. 6.77×10^{-3}

a. 677 b. 0.000677

c. 6,770 d. 0.00677

Write each number in scientific notation.

___ 25. 3,810

a. 3.81×10^3 b. 3.81×10^{-3}

c. 3.81×10^6 d. 3.81×10^5

___ 26. 0.363

a. 3.63×10^{-3} b. 3.63×10^0

c. 3.63×10^{-2} d. 3.63×10^{-1}

Evaluate each expression. Express the result in scientific notation.

___ 27. $(12.25 \times 10^6) \cdot (2.45 \times 10^3)$

a. 3×10^{10} b. 1.47×10^{10}

c. 5×10^3 d. 3×10^7

___ 28. $(23.45 \times 10^9) \div (4.69 \times 10^5)$

a. 1.1×10^{16} b. 5×10^4

c. 1.9×10^5 d. 5×10^9

Evaluate the expressions. Express answers in simplest form.

29. $a^4 \cdot b^2$, if $a = 2$ and $b = 4$.

30. $v^3 \cdot w^5$, if $v = \frac{1}{2}$ and $w = 3$.

31. $m^2 \cdot n^4$, if $m = \frac{3}{4}$ and $n = 8$.

For each increase of one on the Richter scale, an earthquake's vibrations, or seismic waves, are 10 times greater.

Earthquake	Richter Scale Magnitude
Alaska, 1964	9.2
Kobe, Japan, 1995	7.2
Long Beach, California, 1933	6.2

32. How many times greater are the seismic waves of an earthquake with a magnitude of 8 than an aftershock with a magnitude of 2?

33. How many times greater were the seismic waves of the 1964 Alaska earthquake than the 1995 Kobe, Japan earthquake?

The decibel (dB) measures sound. Every 10 dB is a tenfold increase in intensity.

34. The sound of a rocket launching is 130 dB, and the sound of a subway train is 80 dB. How many times more intense is the sound of the rocket than the subway?

35. Poxvirus, which is a large virus, is about 10^{-11} meters wide. *E. coli*, which is an average-size bacterium, is about 10^{-9} meters wide. How many times wider is *E. coli* than poxvirus?

36. The area of the Atlantic Ocean is 8.2×10^7 square kilometers, while the area of the Arctic Ocean is about 14,000,000 square kilometers. About how much larger is the Atlantic Ocean than the Arctic Ocean?