

## Unit 4 Review

For questions 1 and 2, choose the correct answer: A, B, C, or D

1. Which length is an irrational number?

A.  $\sqrt{6.25}$  cm

B.  $\sqrt{9}$  cm

C. 6.4 cm

D.  $\sqrt[3]{48}$  cm

2. Which expression is equal to  $\frac{a^2}{b^2}$ ?

A.  $\frac{a^{-1}b}{ab^{-1}}$

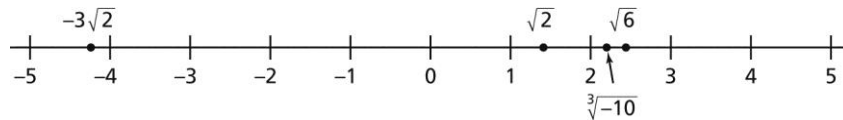
B.  $\frac{ab^{-1}}{a^{-1}b}$

C.  $\frac{a^2b}{ab^2}$

D.  $\frac{ab^2}{a^2b}$

3. a) Which number has been incorrectly located?

Identify the number and mark its correct location.



b) Where would you locate  $\sqrt[3]{-30}$ ? Justify your answer.

4. Evaluate without using a calculator. Explain what you did.

a)  $\sqrt[4]{3^8}$

b)  $\sqrt[3]{-1000}$

c)  $0.01^{-2}$

d)  $\sqrt{\left(\frac{3}{4}\right)^4}$

5. A student simplified  $\left(3c^2d^{\frac{1}{2}}\right)^{-2}\left(2d^2c^{\frac{1}{2}}\right)^{-1}$  as follows:

$$\begin{aligned} \left(3c^2d^{\frac{1}{2}}\right)^{-2}\left(2d^2c^{\frac{1}{2}}\right)^{-1} &= \left(3^{-2}c^0d^{-\frac{3}{2}}\right)\left(2^{-1}d^0c^{-\frac{3}{2}}\right) \\ &= \left(-9d^{-\frac{3}{2}}\right)\left(-2c^{-\frac{3}{2}}\right) \\ &= 18cd^{-3} \\ &= \frac{18c}{d^3} \end{aligned}$$

Identify the errors in this solution, then write a correct solution.

6. Rewrite  $8^{\frac{1}{3}}$  as a radical, then evaluate the radical.

7. Simplify. Which exponent laws did you use?

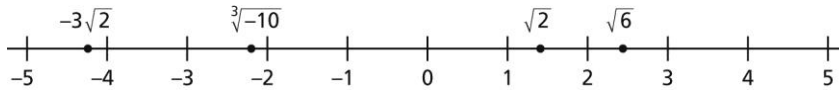
a)  $\left(\frac{x^{-1}y^{\frac{3}{4}}}{x^{-3}y^{-2}}\right)^4$

b)  $(x^{\frac{1}{2}}x^{\frac{3}{2}}y^{-1})^2(y^6)^{\frac{2}{3}}$

**Answers**

1. D                      2. B

3. a)  $\sqrt[3]{-10}$



b)  $\sqrt[3]{-30}$  is less than  $-3$  but greater than  $-4$  because  $(-3)^3 = -27$  and  $(-4)^3 = -64$ .

I used guess and test to calculate  $\sqrt[3]{-30}$  as approximately  $-3.1$ .

4. a) 9                      b)  $-10$                       c) 10 000                      d)  $\frac{9}{16}$

5. In the first line, the student incorrectly applied the power of a power law by adding the exponents instead of multiplying them. In the second line, the student incorrectly wrote  $3^{-2}$  as  $-9$ , instead of  $\frac{1}{9}$ , and  $2^{-1}$  as  $-2$  instead of  $\frac{1}{2}$ . In the third line, the student should not have added the exponents because the bases are different. Here is the correct solution:

$$\left(3c^2d^{\frac{1}{2}}\right)^{-2} \left(2d^2c^{\frac{1}{2}}\right)^{-1} = \left(3^{-2}c^{-4}d^{-1}\right) \left(2^{-1}d^{-2}c^{\frac{1}{2}}\right) = \frac{1}{9} \cdot \frac{1}{2} \cdot c^{-4+\frac{1}{2}} \cdot d^{-1-2} = \frac{1}{18}c^{-\frac{7}{2}}d^{-3} = \frac{1}{18c^{\frac{7}{2}}d^3}$$

6.  $\frac{1}{\sqrt[3]{8}} = \frac{1}{2}$

7. a)  $x^8y^{11}$ ; laws of quotient of powers and power of a power

b)  $x^4y^2$ ; laws of product of powers and power of a power