

Try This 3 and 4 Possible Solutions

TT 3. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 18 and 22 on page 228

18. The student misplaced the exponent and the index. The correct solution is

$$\begin{aligned} 1.96^{\frac{3}{2}} &= \left(\sqrt{1.96}\right)^3 \\ &= (1.4)^3 \\ &= 2.744 \end{aligned}$$

22. Both Luc and Karen have the correct answer. That is,

$$3.2^{4.2} = 3.2^{\frac{42}{10}} = \left(\sqrt[10]{3.2}\right)^{42} \approx 132.3213 \dots$$

Karen's reasoning is more practical because it is difficult to think of a number multiplied by itself 4.2 times. It is easier to visualize the tenth root of 3.2 multiplied by itself 42 times.

TT 4. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 17.a) and 19 on page 242

17. a) The error is the exponents of like bases in the previous step were multiplied together instead of being added together. The correct solution is

$$\begin{aligned} \left(x^2 y^{-3}\right)\left(x^{\frac{1}{2}} y^{-1}\right) &= x^2 \times x^{\frac{1}{2}} \times y^{-3} \times y^{-1} \\ &= x^{2+\frac{1}{2}} \times y^{-3+(-1)} \\ &= x^{2\frac{4}{2}+\frac{1}{2}} \times y^{-4} \\ &= x^{2\frac{5}{2}} y^{-4} \\ &= \frac{x^5}{y^4} \end{aligned}$$

19. a) $\frac{\left(m^{-3} \times n^2\right)^{-4}}{\left(m^2 \times n^{-3}\right)^2} = \left(m^{-5} \times n^5\right)^{-6}$ In this step the Quotient Law was incorrectly applied.

Here, the bases are not identical: $\left(m^{-3} \times n^2\right)$ versus $\left(m^2 \times n^{-3}\right)$.

$$\begin{aligned}
 &= m^{30} \times n^{30} \\
 &= (mn)^{30}
 \end{aligned}$$

The correct solution is

$$\begin{aligned}
 \frac{(m^{-3} \times n^2)^{-4}}{(m^2 \times n^{-3})^2} &= \frac{m^{-3 \times (-4)} n^{2 \times (-4)}}{m^{2 \times 2} n^{-3 \times 2}} \\
 &= \frac{m^{12} n^{-8}}{m^4 n^{-6}} \\
 &= m^{12-4} n^{-8-(-6)} \\
 &= m^8 n^{-2} \\
 &= \frac{m^8}{n^2}
 \end{aligned}$$

$$19. \text{ b) } \left(r^{\frac{1}{2}} \times s^{-\frac{3}{2}} \right)^{\frac{1}{2}} \times \left(r^{-\frac{1}{4}} \times s^{\frac{1}{2}} \right)^{-1} = r^1 \times s^{-1} \times r^{-\frac{5}{4}} \times s^{-\frac{1}{2}}$$

The error occurs where the student added the exponents (Product Law) instead of multiplying them (Power of a Power Law).

$$\begin{aligned}
 &= r^{1-\frac{5}{4}} \times s^{-1-\frac{1}{2}} \\
 &= r^{-\frac{1}{4}} \times s^{-\frac{3}{2}} \\
 &= \frac{1}{r^{\frac{1}{4}} \times s^{\frac{3}{2}}}
 \end{aligned}$$

The correct solution is

$$\begin{aligned}
 \left(r^{\frac{1}{2}} \times s^{-\frac{3}{2}} \right)^{\frac{1}{2}} \times \left(r^{-\frac{1}{4}} \times s^{\frac{1}{2}} \right)^{-1} &= r^{\frac{1}{2} \times \frac{1}{2}} \times s^{-\frac{3}{2} \times \frac{1}{2}} \times r^{-\frac{1}{4} \times (-1)} \times s^{\frac{1}{2} \times (-1)} \\
 &= r^{\frac{1}{4}} \times s^{-\frac{3}{4}} \times r^{\frac{1}{4}} \times s^{-\frac{1}{2}} \\
 &= r^{\frac{1}{4} + \frac{1}{4}} \times s^{-\frac{3}{4} + \left(-\frac{1}{2}\right)} \\
 &= r^{\frac{1}{2}} \times s^{-\frac{5}{4}} = \frac{r^{\frac{1}{2}}}{s^{\frac{5}{4}}}
 \end{aligned}$$