

Assignment

Complete pgs. 290 - 291
Questions 6abc,8,15

Solutions

6. Divide. Express your answers in simplest form.

$$\begin{aligned} \text{a) } & \frac{\sqrt{80}}{\sqrt{10}} \\ &= \sqrt{8} \\ &= \sqrt{(2)(2)(2)} \\ &= 2\sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{-2\sqrt{12}}{4\sqrt{3}} \\ &= \frac{-2\sqrt{4}}{4} \\ &= \frac{-1(2)}{2} \\ &= \frac{-2}{2} \\ &= -1 \end{aligned}$$

$$\begin{aligned} \text{c) } & \frac{3\sqrt{22}}{1\sqrt{11}} \\ &= 3\sqrt{2} \end{aligned}$$

8. Rationalize each denominator. Express each radical in simplest form.

$$\begin{aligned} \text{a) } & \frac{20}{\sqrt{10}} \\ &= \frac{20}{\sqrt{10}} \left(\frac{\sqrt{10}}{\sqrt{10}} \right) \\ &= \frac{20\sqrt{10}}{10} \\ &= 2\sqrt{10} \end{aligned}$$

$$\begin{aligned} \text{b) } & -\frac{\sqrt{21}}{\sqrt{7m}}, m > 0 \\ &= -\frac{\sqrt{21}}{\sqrt{7m}} \left(\frac{\sqrt{7m}}{\sqrt{7m}} \right) \\ &= -\frac{\sqrt{147m}}{7m} \\ &= -\frac{\sqrt{(3)(7)(7)(m)}}{7m} \\ &= -\frac{7\sqrt{3m}}{7m} \\ &= -\sqrt{3m} \end{aligned}$$

Solutions

★ Be careful with this one!

$$\begin{aligned}
 \text{d) } & -\frac{2}{3} \sqrt{\frac{5}{12u}}, u > 0 \\
 & = -\frac{2}{3} \left(\frac{\sqrt{5}}{\sqrt{12u}} \right) \left(\frac{\sqrt{12u}}{\sqrt{12u}} \right) \\
 & = -\frac{2}{3} \left(\frac{\sqrt{60u}}{\sqrt{12u}} \right) \\
 & = -\frac{2}{3} \left(\frac{\sqrt{(2)(2)(3)(5)u}}{\sqrt{12u}} \right) \\
 & = -\frac{2}{3} \left(\frac{2\sqrt{15u}}{\sqrt{12u}} \right) \\
 & = -\frac{4\sqrt{15u}}{3\sqrt{12u}} \\
 & = -\frac{4\sqrt{15u}}{3 \cdot 2\sqrt{3u}} \\
 & = -\frac{2\sqrt{15u}}{3\sqrt{3u}} \\
 & = -\frac{2\sqrt{5} \sqrt{3u}}{3\sqrt{3u}} \\
 & = -\frac{2\sqrt{5}}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{d) } & 20 \sqrt[3]{\frac{6t}{5}} \\
 & = 20 \sqrt[3]{\frac{6t}{5}} \left[\frac{(\sqrt[3]{5})^2}{(\sqrt[3]{5})^2} \right] \\
 & = 20 \sqrt[3]{\frac{6t \cdot 5^2}{5^2}} \\
 & = 20 \sqrt[3]{\frac{150t}{5}} \\
 & = 4 \sqrt[3]{150t}
 \end{aligned}$$

Solutions

15. The period T , in seconds, of a pendulum is related to its length, L , in meters. The period is the time to complete one full cycle and can be approximated with the formula $T = 2\pi \sqrt{\frac{L}{10}}$.

a) Write an equivalent formula with a rational denominator.

$$\begin{aligned} T &= 2\pi \sqrt{\frac{L}{10}} \\ &= 2\pi \frac{\sqrt{L}}{\sqrt{10}} \left(\frac{\sqrt{10}}{\sqrt{10}} \right) \\ &= \frac{2\pi \sqrt{10L}}{10} \\ &= \frac{\pi \sqrt{10L}}{5} \end{aligned}$$

b) The length of the pendulum in the HSBC building in downtown Vancouver is 27m. How long would the pendulum take to complete 3 cycles?

$$\begin{aligned} T &= \frac{\pi \sqrt{10L}}{5} \\ &= \frac{\pi \sqrt{(10)(27)}}{5} \\ &= \frac{\pi \sqrt{270}}{5} \\ &= \frac{\pi \sqrt{(2)(3)(3)(3)(5)}}{5} \\ &= \frac{3\pi \sqrt{30}}{5} \quad (\text{Time to complete 1 cycle}) \\ &\Rightarrow 3 \left(\frac{3\pi \sqrt{30}}{5} \right) \\ &= \frac{9\pi \sqrt{30}}{5} \text{ sec} \quad \text{Time to complete 3 cycles} \end{aligned}$$

Attachments

M0705001.IPP

Nesting Squares.gsp