

Day 4 Homework: Applications of Radical Functions

1. A pendulum can be measured with the equation $T = 2\pi\sqrt{\frac{L}{G}}$ where T is the time in seconds, G is the force in gravity (10m/s^2) and L is the length of the pendulum.

a) find the period (to the nearest hundredth of a second) if a pendulum is 0.9m long 1.89s

b) find the period if the pendulum is 0.049 m long. 0.44

c) solve the equation for length L . $(\frac{T}{2\pi})^2 \cdot G = L$

d) how long would the pendulum be if the period were exactly 1 s?

0.253m

Solve the following applications

2. The difference between an integer and its square root is 12. What is the integer? 16

3. The sum of an integer and twice its square root is 24. What is the integer? 16

4. The sum of an integer and three times its square root is 40. Find the integer. 25

Use $d(h) = \sqrt{2h}$ for #5 - 6

5. If a plane flies at 30,000 ft, how far away is the horizon? 244.949

6. Janine was looking out across the ocean from her hotel room on the beach. Her eyes were 250 ft above the ground. She saw a ship on the horizon. Approximately how far was the ship from her? $22,361$

When a car comes to a sudden stop, you can determine the skidding distance (in feet) for a given speed (in miles per hour) using the formula $s(x) = 2\sqrt{5x}$ where s is skidding distance and x is speed. Calculate the skidding distance for the following speeds.

7. 55mi/h

8. 65 mi/h

9. 75 mi/h

10. 40 mi/h

$x = 33.166\text{ft}$ $x = 36.056\text{ft}$ $x = 38.73\text{ft}$ $x = 28.284\text{ft}$

Day 5 Homework: Direct and Inverse Variation

Find the Missing Variable:

$y = kx$ $k = y/x$ $k = (-4)(2) = -8$

1) y varies directly with x . If $y = -4$ when $x = 2$, find y when $x = -6$.

$y = -8(-6) = 48$

2) y varies inversely with x . If $y = 40$ when $x = 16$, find x when $y = -5$.

$y = \frac{k}{x}$ $k = yx$ $k = 40(16) = 640$

$-5 = \frac{640}{x}$
 $-5x = 640$

$x = \frac{640}{-5} = -128$

$$\textcircled{2} \quad x - \sqrt{x} = 12$$

$$-\sqrt{x} = 12 - x$$

$$\sqrt{x} = x - 12$$

$$x = (x - 12)^2$$

$$x = x^2 - 24x + 144$$

$$0 = x^2 - 25x + 144$$

$$0 = (x - 9)(x - 16)$$

$$9 - \sqrt{9} = 12?$$

$$9 - 3 \stackrel{?}{=} 12?$$

Nope!

$$16 - \sqrt{16} = 12?$$

$$16 - 4 \stackrel{?}{=} 12?$$

Yep!

$$\textcircled{3} \quad x + 2\sqrt{x} = 24$$

$$2\sqrt{x} = 24 - x$$

$$\sqrt{x} = 12 - \frac{x}{2}$$

$$x = \left(12 - \frac{x}{2}\right)^2$$

↓ Box Meth.
to get

$$x = \frac{1}{4}x^2 - 12x + 144$$

$$0 = \frac{1}{4}x^2 - 13x + 144$$

$$\begin{array}{r} -13 \mid 36 \\ -49 \mid 49 \end{array}$$

$$0 = \frac{1}{4}x^2 - 4x - 9x + 144$$

$$\frac{1}{4}x(x - 16) - 9(x + 16)$$

$$0 = (\frac{1}{4}x - 9)(x - 16)$$

$$16 + 2\sqrt{16} = 24?$$

$$16 + 2(4) = 24?$$

$$16 + 8 = 24 \checkmark \text{ yep}$$

$$36 + 2\sqrt{36} = 24?$$

$$36 + 2(6) = 24?$$

$$48 = 24? \text{ Nope!}$$

$$4) x + 3\sqrt{x} = 40$$

$$3\sqrt{x} = 40 - x$$

$$\sqrt{x} = \frac{40}{3} - \frac{x}{3}$$

$$x = \left(\frac{40}{3} - \frac{x}{3}\right)^2$$

	$-\frac{x}{3}$	$\frac{40}{3}$
$-\frac{x}{3}$	$\frac{1}{9}x^2$	$-\frac{40}{9}x$
$\frac{40}{3}$	$-\frac{40}{9}x$	$\frac{1600}{9}$

$$x = \frac{1}{9}x^2 - \frac{80}{9}x + \frac{1600}{9}$$

$$0 = \frac{1}{9}x^2 - \frac{80}{9}x + \frac{1600}{9}$$

$$0 = x^2 - 80x + 1600$$

$$0 = (x - 64)(x - 25)$$

$$x = 64 \quad x = 25$$

multiply
by 9 so
easier to
work with

$$64 + 3\sqrt{64} = 40?$$

$$64 + 24 = 40?$$

$$88 = 40?$$

Nope!

$$25 + 3\sqrt{25} = 40?$$

$$25 + 15 = 40?$$

$$40 = 40?$$

Yep!