Name: _____ Period: _____ Date: _____

Ellipses and Circles Word Problems

The shape of a roller coaster loop in an amusement park can be modeled by $\frac{y^2}{3306.25} + \frac{x^2}{2025} = 1$.

1. What is the width of the loop along the horizontal axis? (Assume dimensions are in feet)

2. Determine the height of the roller coaster from the ground when it reaches the top of the loop, if the lower rail is 30 feet from ground level.

3. What is the eccentricity of the ellipse?

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Answers

The shape of a roller coaster loop in an amusement park can be modeled by $\frac{y^2}{3306.25} + \frac{x^2}{2025} = 1$.

1. What is the width of the loop along the horizontal axis? (Assume dimensions are in feet)

The $x - term$ has 2025 associated with it and is less than 3306.25.

This means that $b^2 = 2025 \rightarrow b = 45$

So, width of the loop is $45\ ft.$

2. Determine the height of the roller coaster from the ground when it reaches the top of the loop, if the lower rail is 30 feet from ground level.

Here, $a^2 = 3306.25$

$\rightarrow a = \sqrt{3306.25}$

$a = 57.5 \rightarrow 2a = 115$

Since lower rail is 30 feet above the ground, so height of the roller coaster from the ground is,

Height $= 115 + 30 = 145\ ft.$

3. What is the eccentricity of the ellipse?

$c = \sqrt{a^2 - b^2}$

$c = \sqrt{3306.25 - 2025} = 35.79$

Now eccentricity $e = \frac{c}{a}$

$\rightarrow e = \frac{35.79}{57.5} = 0.62$