Marble roll quadratic graphing leading to a Qalculate! computer graphing exercise

Use your marble roll data from yesterday.

k = _____ r =

The equation of the marble roll curve is:

 $y = \frac{-k x^2}{r^2} + k$

k

In the following example r was 7.5 cm and k was 18 cm. Your numbers will **<u>differ</u>**, as will your specific equation. Use your own k and r values!

Terminology:

Parabola:	The curve made by a second degree equation, by an
	quadratic function.

- **y-intercept**: Where the graph crosses the y-axis. Often a starting value (accelerated ball roll, ball drop data).
- **x-intercepts**: Where the graph crosses the x-axis. Also called roots, solutions, zeros of the function.

Vertex: The topmost (or bottommost) point in the parabola.

1. The Qalculate! calculator is on the Accessories submenu of the Application menu. Enter the equation as seen below with the appropriate parentheses .	2. Click on the button to the right of the data entry window to process the equation.
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-(18/(7.5^2))•x^2+18 ((-(18/(7.5^2)))•(x^2))+18 RAD (∴ (x^2))+18 (∴ (∴ (x^2))+18 (∴ (∴	$\begin{bmatrix} -(18/(7.5^{2})) \cdot x^{2} + 18 \\ ((-(18/(7.5^{2}))) \cdot (x^{2})) + 18 \end{bmatrix} = 18 - 0.32x^{2}$
✓ Keypad ▷ History Exact Fraction Normal ‡ Decimal ‡ $f(x)$ x^{Y} x^{2} 7 8 9 DEL AC sqrt log In 4 5 6 × ‡ x! cos tan 1 2 3 + - hyp inv sin 0 . EXP Ans =	✓ Keypad ▷ History Exact Fraction Normal ‡ Decimal ‡ $f(x)$ x^{y} x^{2} 7 8 9 DEL AC sqrt log In 4 5 6 × ‡ x! cos tan 1 2 3 + - hyp inv sin 0 . EXP Ans =

Equation format in Qalculate!: $-(_ /(_ ^2))*x^2+ _$ k r

3. From the File menu, select Plot	4. The plot window will open automatically.			
Function/Data.				
File Edit Mode Functions Variables Units Help	Data Function Range Appearance			
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22 Quit Ctrl+Q 5 6 × ÷ x! cos tan				
hyp inv sin				
○ Deg ③ Rad ○ Gra 0 . EXP Ans =	Bave K Close			
5. Click on the Function Range tab and set your min to one less than your negative root, your max to one more than your positive6. Return to the data tab (seen above, and click on the +Add button. The graph of you marble will appear.				
root.				
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Data Function Range Appearance				
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Max 8.5	10			
Sampling rate				
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Do the x-intercepts and the vertex the measurements made for your				
Image: Save Image: Save Image: Save Image: Save	-			
	the measurements made for your marble? Does the curve look like your marble roll curve?			