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

Use your marble roll data from yesterday.
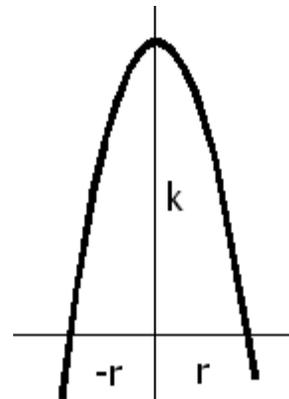
k = _____

r = _____

The equation of the marble roll curve is: $y=\dfrac{-k\,x^2}{r^2}+k$

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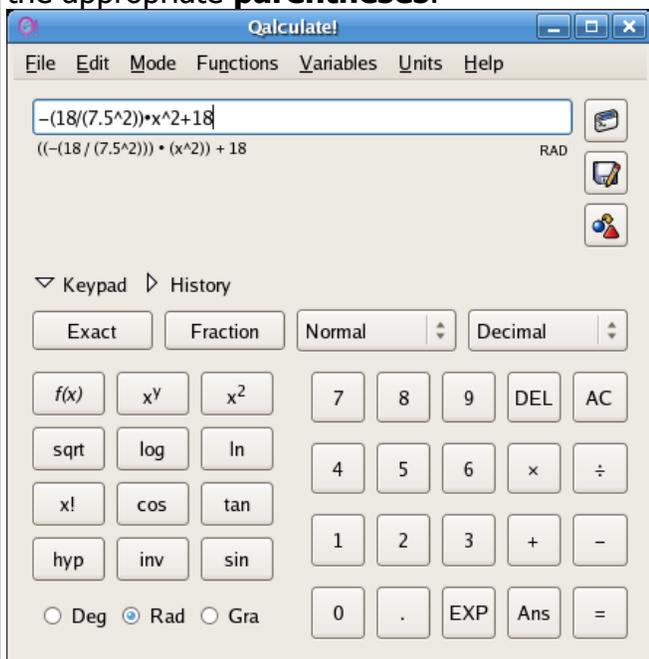
Terminology:

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).
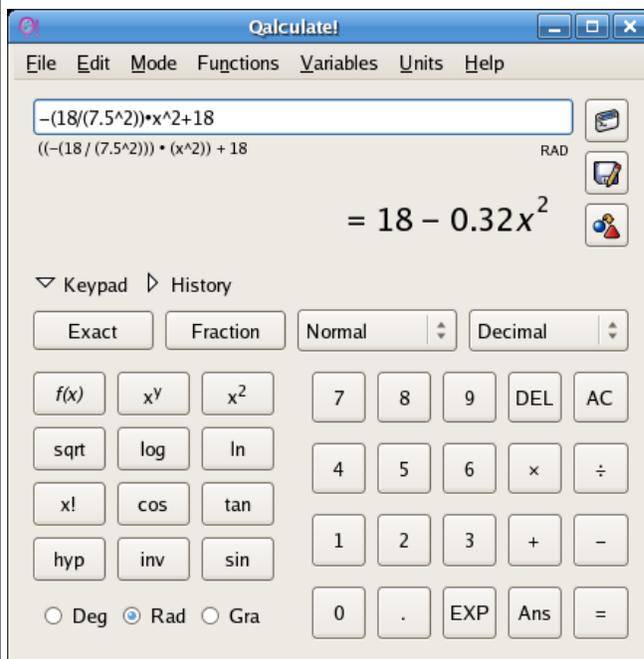
x-intercepts: Where the graph crosses the x-axis. Also called roots, solutions, zeros of the function.

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.
Qalculate!	**Qalculate!**
File Edit Mode Functions Variables Units Help	File Edit Mode Functions Variables Units Help
–(18/(7.5^2))•x^2+18	–(18/(7.5^2))•x^2+18
((–(18 / (7.5^2))) • (x^2)) + 18 RAD	((–(18 / (7.5^2))) • (x^2)) + 18 RAD
	$= 18 - 0.32x^2$
▽ Keypad ▷ History	▽ Keypad ▷ History
Exact Fraction Normal Decimal	Exact Fraction Normal Decimal
f(x) x^y x^2 7 8 9 DEL AC	f(x) x^y x^2 7 8 9 DEL AC
sqrt log ln 4 5 6 × ÷	sqrt log ln 4 5 6 × ÷
x! cos tan 1 2 3 + –	x! cos tan 1 2 3 + –
hyp inv sin	hyp inv sin
○ Deg ⦿ Rad ○ Gra 0 . EXP Ans =	○ Deg ⦿ Rad ○ Gra 0 . EXP Ans =

Equation format in Qalculate!: –(_____ /(_____^2))*x^2+ _____
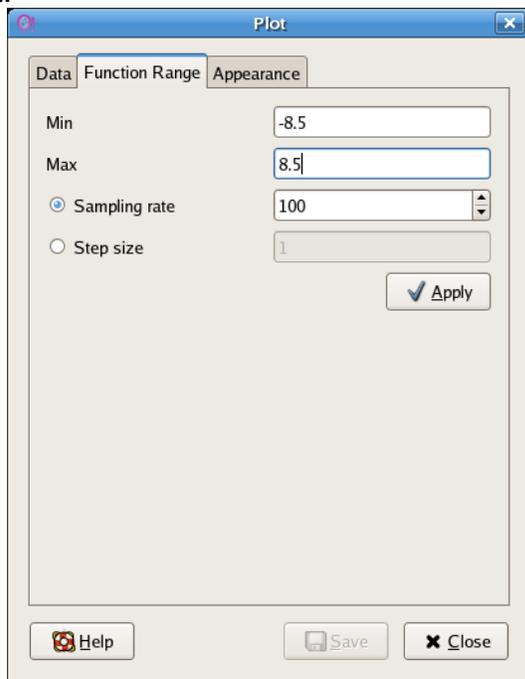
↑ k   ↑ r   ↑ k

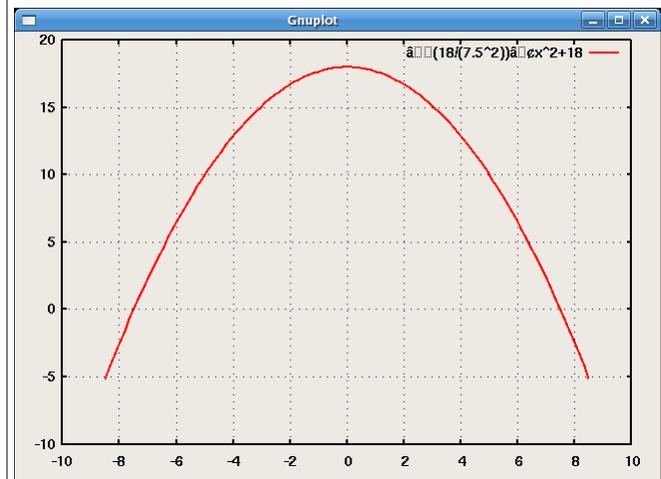3. From the File menu, select Plot Function/Data.
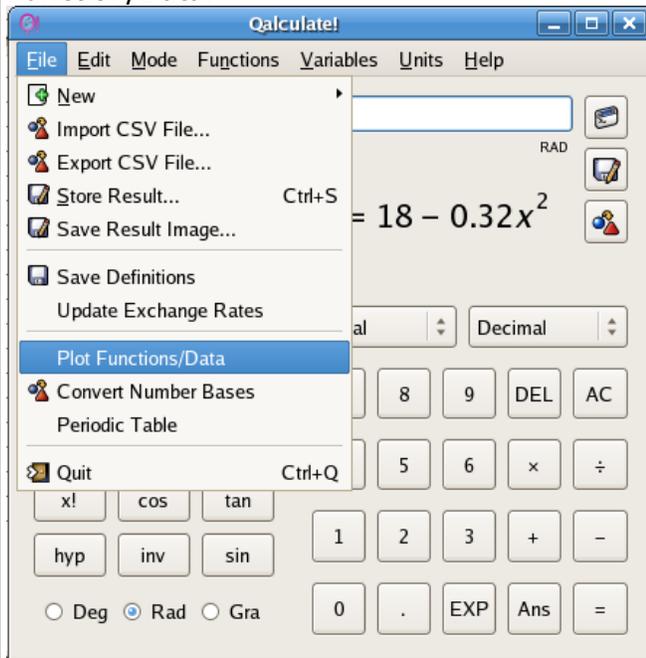
4. The plot window will open automatically.
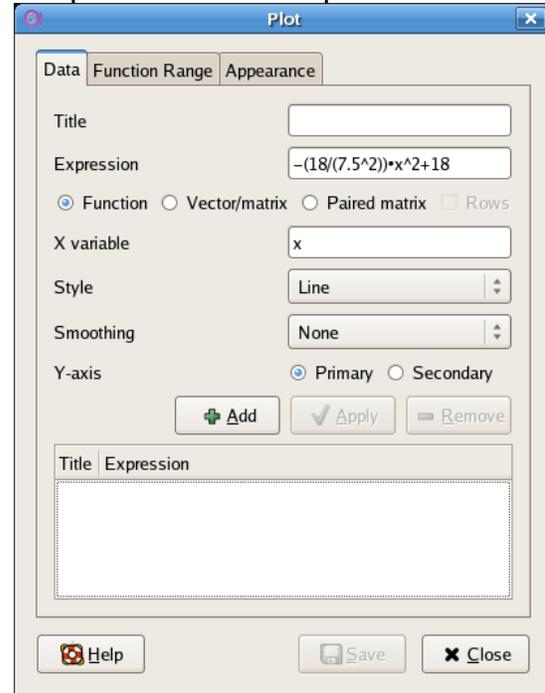
5. Click on the Function Range tab and set your min to one less than your negative root, your max to one more than your positive root.

6. Return to the data tab (seen above, and click on the +Add button. The graph of you marble will appear.

Do the x-intercepts and the vertex agree with the measurements made for your marble? Does the curve look like your marble roll curve?