**Fathom Activity – Quadratic Equations**

Follow the steps exactly. Place a check after completing each step.

1. Open Fathom.
2. Plug in your motion detector.
3. Click on Collections at the top and drag down a new collection.
4. Click on the “plug” icon in the top right corner of the motion detector box and drag into your collection box.
5. Click on your collection box and drag down a table.
6. Click on your collection box again and drag down a graph.
7. Click on Time in your table and drag to the x-axis and drop.
8. Click on Distance in your table and drag to the y-axis and drop.
9. In your experiment box, change the cases per second to be 40 and make sure your experiment will last 5 seconds.
10. When ready, perform your experiment by clicking Turn Experiment On. You can either record the ball bouncing or yourself walking toward and away from the motion detector to obtain the graph needed.
11. If you do not like your graph, you can try again by just repeating #10.
12. Once you have obtained a graph that you need, you can get rid of unwanted data points by either clicking on the point, or dragging a box over them, then select Edit/Delete Cases. Delete all data points that you do not need to examine your parabola.
13. After your graph is the way you want, drag down 3 sliders. Name them a, b, and c.
14. Click on the graph. Then click on Graph at the top. Select Plot Function.
15. Type in the standard form of a quadratic equation, using “Time” as your x. It should look like this: $a\*Time^{2}+b\*Time+c$. Click Apply, then OK.
16. Use your sliders to align the graph with your points. You can make the numbers on your slider more exact if you spread out your number line by dragging the hand left and right along the line. This could take a few minutes.
17. Once you have placed your graph DIRECTLY on top of your data points, copy down your equation using your a, b, and c in standard form. ($y=ax^{2}+bx+c$)
18. Using your graph, estimate the maximum or minimum value. What does it mean in context of your experiment? Does it accurately describe what happened when you performed the experiment?
19. Use your calculator to find the exact maximum or minimum. How close were you?
20. Describe the ball’s, or your, position after 1.5 seconds. Use your calculator to check your results.
21. Find the change in height between any 2 seconds.
22. Find the change in height between another 2 seconds. Are the changes different or the same? Explain your thoughts about why or why not?
23. Now repeat the experiment, but make your parabola flip the other way. Repeat steps #11-21.

Fathom Activity – Quadratic Equations Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Equation for Graph #1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Max/Min coordinate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Prediction at 1.5 seconds: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Change in height over 2 seconds: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Change in height over a different 2 seconds: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Equation for Graph #2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Max/Min coordinate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Prediction at 1.5 seconds: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Change in height over 2 seconds: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Change in height over a different 2 seconds: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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