Thread 2, Quiz 1 – Quadratic Relations

/K 4 /T 4 /C 4 /A 4

Version 1 · 20 minutes

Marks *Show your work for every question. Write your steps clearly. Do not write only a final answer.*

K 2 1. Find the finite differences. Is each relation linear, quadratic, or neither?

a)

x	y	First diff.	Second diff.
0	1		
1	2		
2	7		
3	16		
4	29		

The relation is _____ .

b)

x	y	First diff.	Second diff.
1	3		
2	6		
3	12		
4	24		
5	48		

The relation is _____ .

K 2 2. Use the step pattern to sketch $y = \frac{1}{2}x^2 - 4$ on the grid. Do not make a table of values. Then fill in the blanks.

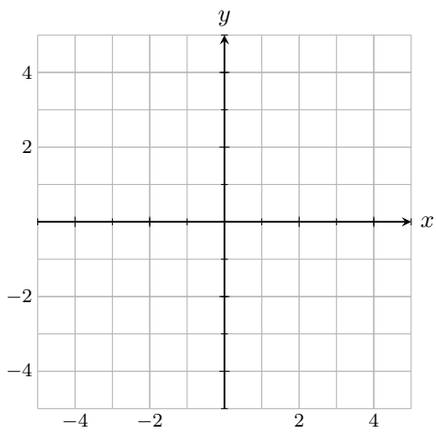
Opens: _____

Vertex: _____

Axis of symmetry: _____

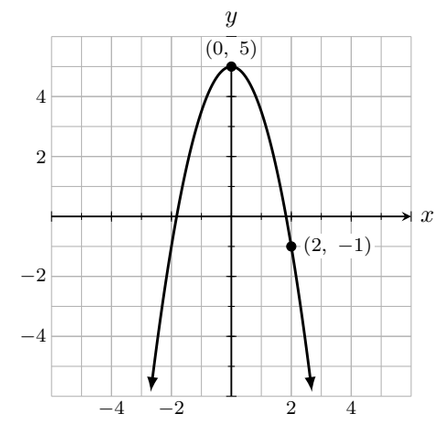
Max. or min. value: _____

y-intercept: _____



T 2 3. The graph shows a parabola. The relation has the form $y = ax^2 + k$. The vertex and one other point are marked.

Write the equation of the parabola.
Explain how you found a.



T 2 4. The table shows some points on a parabola. The relation has the form $y = ax^2$.

x	y	First diff.
0	0	
1	2	
2	8	
3	18	

a) Write the equation of the relation. Explain how you found a.

b) Write the value of y when $x = -3$. Do not calculate. Explain how you know.

Marks

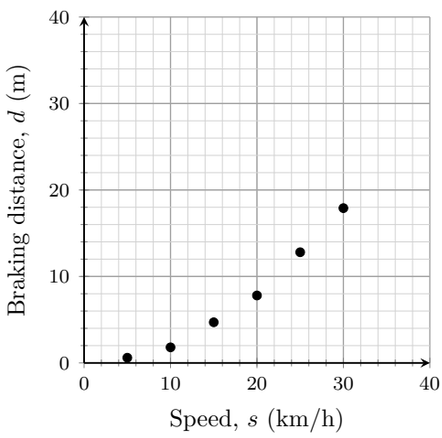
C 2 5. Maya made this table of finite differences. The second differences are not constant. So Maya decided the relation is not quadratic.

What mistake did Maya make? What should Maya do instead?

x	y	First diff.	Second diff.
-2	5		
		-3	
-1	2		2
		-1	
0	1		5
		4	
2	5		1
		5	
3	10		11
		16	
5	26		

C 2 6. Compare the graphs of $y = 3x^2 - 2$ and $y = -3x^2 - 2$. Explain how the two graphs are alike. Explain how the two graphs are different. Use the words *vertex*, *axis of symmetry*, and *maximum* or *minimum* in your answer.

A 4 7. Leo rides his bicycle on a wet road. He brakes at different speeds. Each time, he measures how far the bicycle travels after he brakes. The scatter plot shows his data.



a) Which variable is the independent variable? Use Leo's situation to explain why.

b) Draw a curve of best fit. Use the curve to estimate the braking distance at 22 km/h. Is this estimate interpolation or extrapolation?

c) The model $d = 0.02s^2$ fits the data. Use the model to predict the braking distance at 40 km/h. Is this prediction as reliable as your answer to b)? Explain why.

d) Now Leo measures each distance from a cone. The cone is 3 m before the spot where he starts to brake. Write the new model. Which part of the equation changed?

