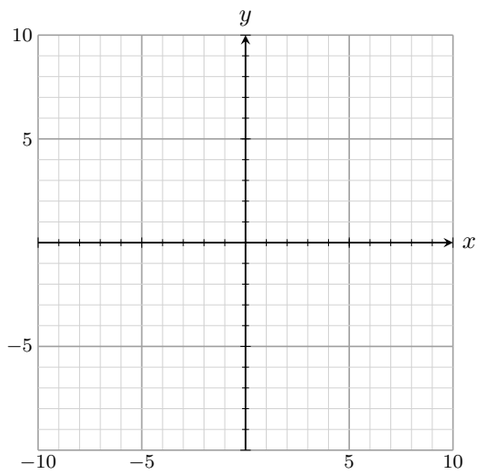
Practice Test – Quadratic Relations

/K 6 /T 6 /C 6 /A 6

Practice · about 30 minutes

Marks *For all questions, use good form. Show your work: do not simply write a final answer.*

K 3 1. Sketch $y = -\frac{1}{2}(x-2)^2+7$ on the grid. Label the vertex and the y-intercept. Then complete each line.



Vertex: _____

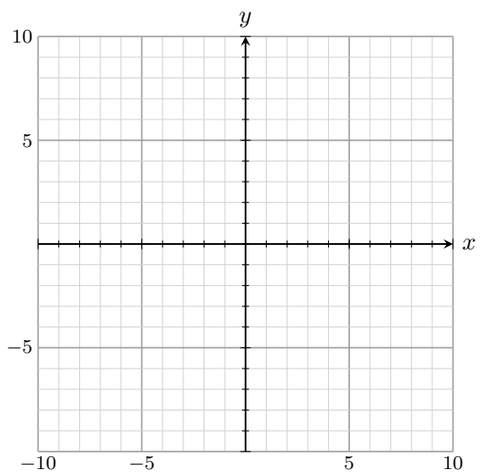
Axis of symmetry: _____

K 1 2. Use finite differences to decide whether this relation is *linear*, *quadratic*, or *neither*.

x	y	First differences	Second differences
-1	-6		
0	1		
1	4		
2	3		
3	-2		

The relation is _____.

K 2 3. Sketch $y = (x+6)(x+2)$ on the grid, using its factors. Then complete each line.

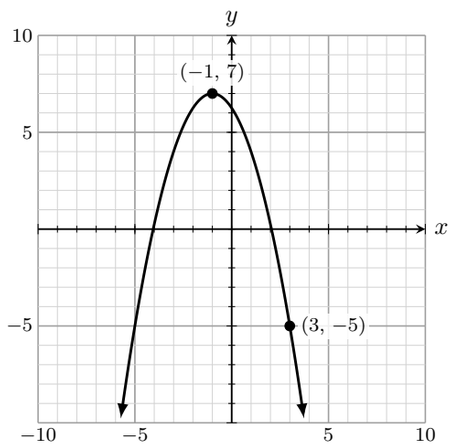


Zeros: _____

Vertex: _____

Marks

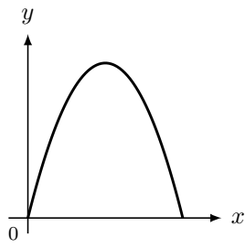
T 3 4. Write an equation in the form $y = a(x - h)^2 + k$ for this parabola. The vertex and one other point are marked.



T 3 5. A fountain nozzle is at ground level. Its jet of water is modelled by

$$y = -0.5(x - 4)^2 + 8$$

where x is the horizontal distance from the nozzle and y is the height of the water, both in metres.

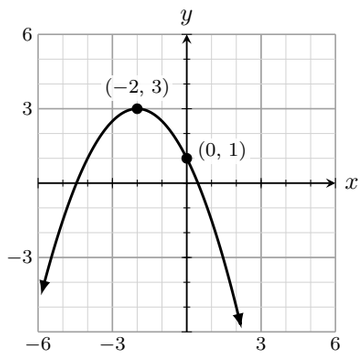


a) How far from the nozzle does the water land? Explain how symmetry helps. **[T 1]**

b) A statue 3 m tall stands 7 m from the nozzle. Does the water pass over it? Explain. **[T 1]**

c) The water is 7.5 m high 3 m from the nozzle. Without substituting, at what other distance is it 7.5 m high? Explain. **[T 1]**

C 2 6.



Which equation matches the graph? Explain why you chose it, and why each of the others does not match.

A $y = -\frac{1}{2}(x - 2)^2 + 3$

B $y = -\frac{1}{2}(x + 2)^2 + 3$

C $y = -2(x + 2)^2 + 3$

Marks

C 2 7.

x	y	First diff.
0	1	
		3
1	4	
		3
2	7	
		6
4	13	
		3
5	16	

Priya made this table and wrote: *"The first differences are not all the same, so this relation is not linear."*

Explain the flaw in Priya's reasoning.

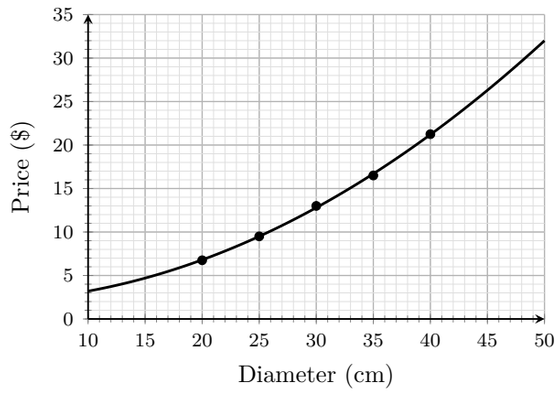
C 2 8. Explain why $8^0 = 1$. Use a pattern or an exponent law in your explanation.

A 3 9. The main cable of a footbridge hangs between two towers 100 m apart. Each end is fixed to the top of a tower, 29 m above the deck. The lowest point of the cable is halfway between the towers, 4 m above the deck. Let x be the horizontal distance from the left tower, in metres, and y the height of the cable above the deck, in metres.

a) Write an equation in vertex form that models the cable. **[A 2]**

b) A longer bridge's cable is modelled by $y = 0.004(x - 75)^2 + 6$ (x and y as above). What do $h = 75$ and $k = 6$ tell you about it? **[A 1]**

A 3 10. A pizzeria sets the price of a pizza by its diameter. Its five sizes, from 20 cm to 40 cm, are plotted below, with a curve of best fit drawn and continued to 50 cm.



a) Use the curve to estimate the price of a pizza 32 cm across and of one 50 cm across. **[A 2]**

32 cm: _____

50 cm: _____

b) Of the two diameters, 32 cm and 50 cm, which gives an *interpolation* and which an *extrapolation*? Which estimate would you trust more, and why? **[A 1]**