Intercepts Form

Adapted from Principles of Mathematics 10, McGraw-Hill Ryerson, 2007.

Sketch on the grids printed here. Show your substitution whenever you find a. Your Summary has the ideas from today's discussion.

1. Here are the equations of three parabolas. Complete the analysis table.

Relation	**a)** $y = 3(x-2)(x-4)$	**b)** $y = -(x-3)(x-9)$	**c)** $y = \frac{1}{2}(x+8)(x+4)$
Zeros			
Axis of symmetry (show how)			
Vertex (show how)			
Opens			
Maximum or minimum value			
Vertical stretch or compression			
y-intercept (show how)			

2. Each parabola is described in words. Write its equation in intercepts form.

a) Its zeros are -4 and 4. It passes through $(2,\ -24)$.

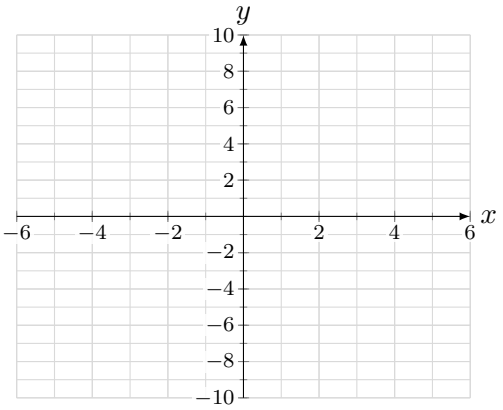
b) Its zeros are 2 and 10. It passes through $(8,\ 9)$.

c) Its zeros are -5 and 0. It passes through $(-4,\ 2)$.

d) Its zeros are -1 and 7. Its minimum value is -8.

3. Here are the equations of four parabolas. Sketch each one on its grid. Use no table. Write its zeros, its axis of symmetry, and its vertex.

a) $y = (x + 3)(x - 3)$

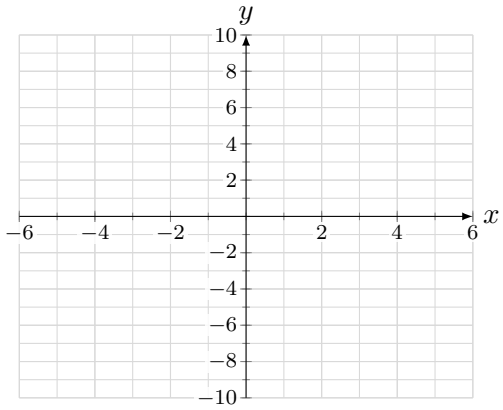


Zeros _____

Axis of symmetry _____

Vertex _____

b) $y = -2(x + 4)(x + 2)$

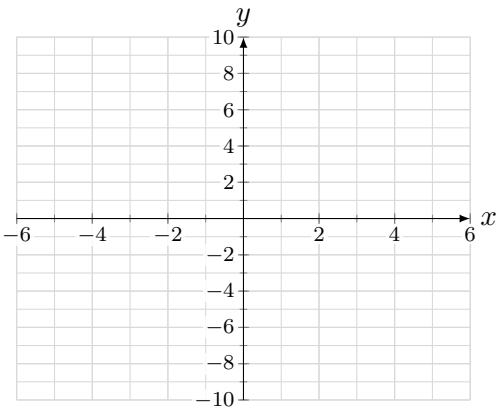


Zeros _____

Axis of symmetry _____

Vertex _____

c) $y = \frac{1}{2}(x + 2)(x - 2)$

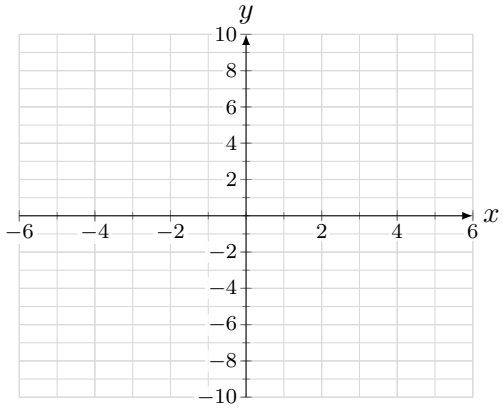


Zeros _____

Axis of symmetry _____

Vertex _____

d) $y = -3(x - 1)(x - 3)$



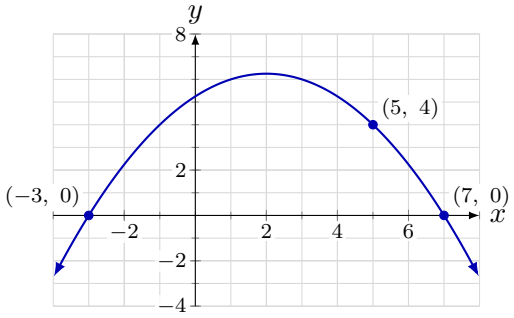
Zeros _____

Axis of symmetry _____

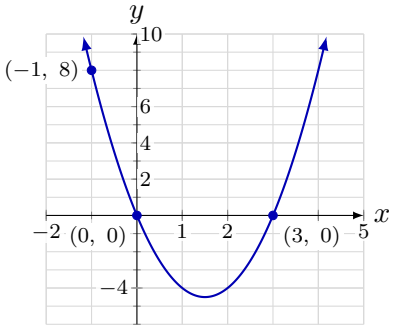
Vertex _____

4. Each graph shows a parabola. Its zeros and one more point are marked. Write its equation in intercepts form. Check it with a point you did not use.

a)



b)

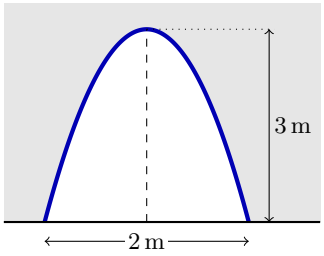


_____ _____

_____ _____

_____ _____

5. An old building has a doorway in the shape of a parabolic arch. The doorway is 2 m wide at the floor and 3 m tall at its centre. Put the floor on the x-axis and the left side of the doorway at the origin. x is the distance across the floor from the left side, and y is the height of the arch, both in metres.



a) Write an equation for the arch in intercepts form. Show how you find a.

_____

_____

b) How high is the arch 0.5 m in from the left side?

_____

c) A person 2 m tall walks through the doorway, 0.4 m in from the left side. Is the arch at least 2 m high there? Can the person stand up straight there?

_____

_____

6. The table shows points on a parabola. Give the parabola in words and as two equations.

x	y
2	-2.5
3	0.0
4	1.5
5	2.0
6	1.5
7	0.0
8	-2.5

a) In words: which way does it open? Where are its zeros? What is its axis of symmetry? Where is its vertex?

b) As an equation in intercepts form. Show how you find a.

c) As an equation in vertex form. Show how you find a. Then check that both of your equations give $y = -2.5$ when $x = 8$.

Intercepts Form — Hints

Stuck? Read the hint for that question, then go back and try again. Each hint points back to an idea from today's discussion. It does not give you the answer.

Question 1

Recall Cards 2 and 3 (Questions 2 and 3 on the discussion page): what happens to the product when one bracket is zero. Recall Card 5 (Question 5 on the discussion page): where the vertex sits, compared with the two zeros. Recall from the Analysing Vertex Form and Equations from Graphs summary how to find a y-intercept.

Question 2

Recall Card 7 (Question 7 on the discussion page): what the zeros give you, and what the extra point is for. For d), recall Card 5 (Question 5 on the discussion page).

Question 3

Recall Card 6 (Question 6 on the discussion page), where we sketched a parabola with no table. The summary lists the steps for sketching from intercepts form.

Question 4

Recall Card 7 (Question 7 on the discussion page), where a graph gave us an equation with two brackets.

Question 5

Recall the gate on Card 8 (Question 8 on the discussion page). Picture the doorway on axes the same way.

Question 6

Recall Card 9 (Question 9 on the discussion page), where one table gave us two equations. For the words, recall Cards 2 and 9 (Questions 2 and 9 on the discussion page): where the zeros and the vertex show in a table. Recall Card 5 (Question 5 on the discussion page): where the axis of symmetry sits, compared with the zeros.