1. For each of the following parabolas, find the coordinates of the vertex and the equation of the axis of symmetry.

a) $y = 2x^2 + 8x + 2$

$V(-2, -6); x = -2$

b) $y = -3x^2 + 6x - 6$

$V(1, -3); x = 1$

c) $y = 2x^2 - 3x$

$V\left(\frac{3}{4}, \frac{-9}{8}\right); x = \frac{3}{4}$

d) $y = -2x^2 + 6$

$V(0, 6); x = 0$

ACTIVITY 2 Finding the zeros – General form

Consider the quadratic function $f(x) = 2x^2 - 7x + 3$ (general form).

a) What equation must we solve to determine the zeros of the function? $2x^2 - 7x + 3 = 0$

b) Solve this equation to determine the zeros. $a = 2; b = -7; c = 3; \Delta = 25; x_1 = \frac{1}{2}$ and $x_2 = 3$

FINDING THE ZEROS – GENERAL FORM

Consider the function $f(x) = ax^2 + bx + c$.

To determine the zeros of function f, we solve the quadratic equation $ax^2 + bx + c = 0$.

(See solving quadratic equations page 33.)

Ex.: To find the zeros of
$f(x) = 2x^2 - 5x - 12$,
we solve $2x^2 - 5x - 12 = 0$.
We get the zeros $\frac{-3}{2}$ and 4.

## ACTIVITY 3 Graphing a parabola – General form

Consider the function $f(x) = 2x^2 - 4x - 6$.

Use the following procedure to graph the function.

1. Identify the parameters a, b and c. $a = 2; b = -4; c = -6$
2. Is the parabola open upward or downward? $Upward\ since\ a > 0$
3. What are the coordinates of the vertex? $V(1, -8)$
4. Find, if they exist, the zeros of the function.
   $\Delta = 64.$ There are two zeros: $x_1 = -1$ and $x_2 = 3$.
5. What is the y-intercept? -6
6. Complete the following table of values.

x	−1	0	1	2	3
y	0	-6	-8	-6	0
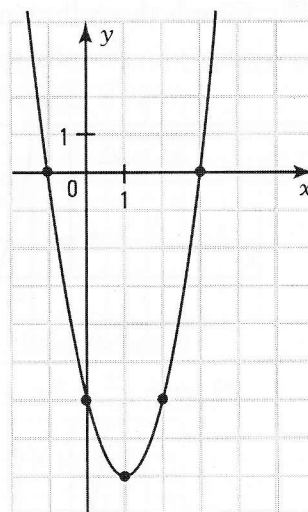
The axis of symmetry is useful in graphing the parabola.

7. Graph the parabola.