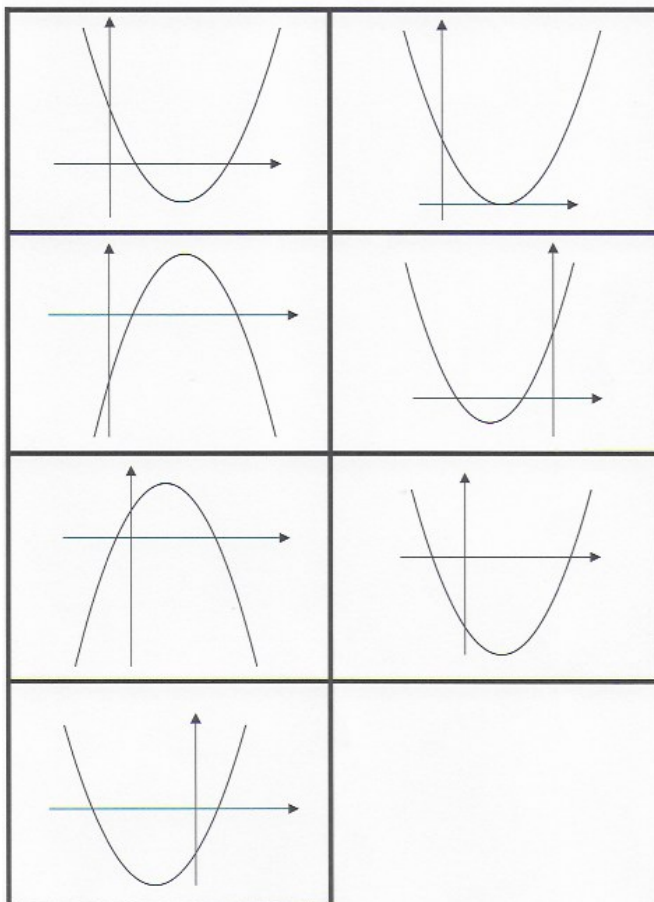## QUADRATIC MATCHING 1

$y = x^2 + 6x - 16$	$y = x^2 - 8x + 16$
$y = 8 - x^2 + 2x$	$y = 6x - x^2 - 8$
$y = x^2 - 10x + 16$	$y = x^2 + 6x + 8$
$y = x^2 - 6x - 16$	$y = (x - 8)(x + 2)$
$y = (x + 4)(x + 2)$	$y = (x + 2)(4 - x)$
$y = (x - 4)(2 - x)$	$y = (x - 8)(x - 2)$
$y = (x - 4)(x - 4)$	$y = (x + 8)(x - 2)$

Graphs and equations of 7 quadratic functions are given here.

Match them and put them into 7 sets. Write down the coordinates of the intercepts with the axes.

Make a poster showing the graph of each function with the matching equations.

In all these examples the coefficient of the quadratic term is +1 or -1. Choose your own quadratic function where this coefficient is not equal to +1 or -1 and complete your poster your own 8th set with its graph, equations and properties.

HELP

First use the cards in set C and match the equations of the quadratic functions with the factorised forms.

Then match the graphs given in set B to the equations to make up the 7 sets.

Then use the cards in set E and match this information about the intercepts of the graph with the axes to the 7 sets.

NEXT

Match the remaining cards in sets A1 and A2 with the other cards.

Resources: Cards sets A1, A2, B, C, D and E.

CARD SET A1 Sort the cards into 7 sets corresponding to 7 quadratic functions and their properties.

The quadratic functions are written in the forms: $y = ax^2 + bx + c$; $y = (x + p)(x + q)$;   and $y = a(x + r)^2 + s$

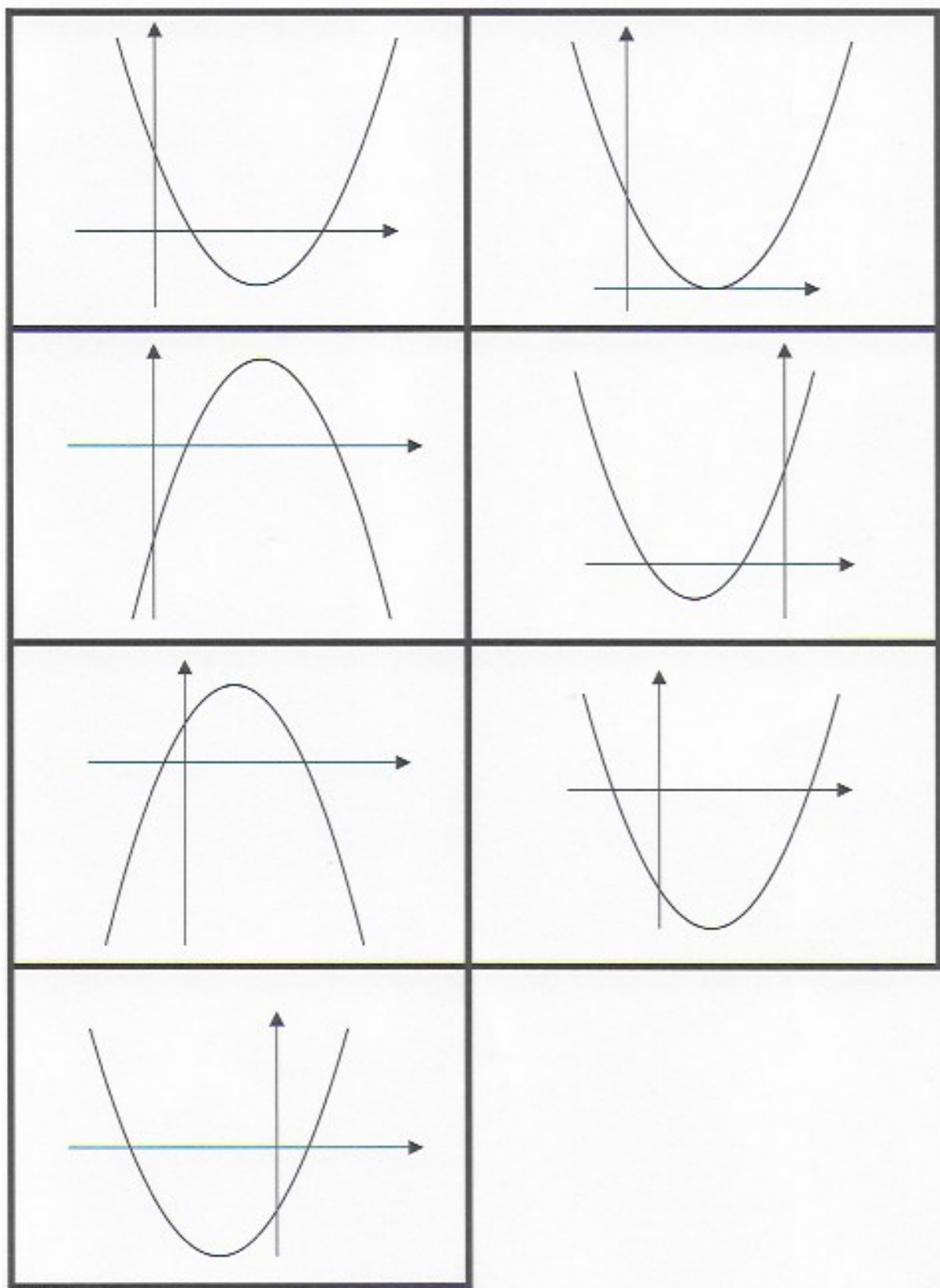|	
$y = x^2 + 6x - 16$	$y = x^2 - 8x + 16$
$y = 8 - x^2 + 2x$	$y = 6x - x^2 - 8$
$y = x^2 - 10x + 16$	$y = x^2 + 6x + 8$
$y = x^2 - 6x - 16$	$y = (x - 8)(x + 2)$
$y = (x + 4)(x + 2)$	$y = (x + 2)(4 - x)$
$y = (x - 4)(2 - x)$	$y = (x - 8)(x - 2)$
$y = (x - 4)(x - 4)$	$y = (x + 8)(x - 2)$
$y = (x + 3)^2 - 25$	$y = (x - 4)^2$
$y = (x - 5)^2 - 9$	$y = -(x - 3)^2 + 1$
$y = -(x - 1)^2 + 9$	$y = (x + 3)^2 - 1$
$y = (x - 3)^2 - 25$	**Minimum at (3, –25)**
Minimum at (–3, –1)	**Maximum at (1, 9)**

CARD SET A2 Sort the cards into 7 sets corresponding to 7 quadratic functions and their properties
The quadratic functions are written in the forms: $y = ax^2 + bx + c$; $y = (x + p)(x + q)$;   and $y = a(x + r)^2 + s$

Maximum at (3, 1)	**Minimum at (5, –9)**
Minimum at (4, 0)	**Minimum at (–3, –25)**
$x = 0, y = -16$	$x = 0, y = 16$
$x = 0, y = 16$	$x = 0, y = -8$
$x = 0, y = 8$	$x = 0, y = 8$
$x = 0, y = -16$	$y = 0, x = 8 \text{ or } -2$
$y = 0, x = -4 \text{ or } -2$	$y = 0, x = -2 \text{ or } 4$
$y = 0, x = 4 \text{ or } 2$	$y = 0, x = 8 \text{ or } 2$
$y = 0, x = 4$	$y = 0, x = -8 \text{ or } 2$

CARD SET B
Match the graphs to the corresponding cards showing the equations and properties of the functions.

CARD SET C

$y = x^2 + 6x - 16$	$y = x^2 - 8x + 16$
$y = 8 - x^2 + 2x$	$y = 6x - x^2 - 8$
$y = x^2 - 10x + 16$	$y = x^2 + 6x + 8$
$y = x^2 - 6x - 16$	$y = (x - 8)(x + 2)$
$y = (x + 4)(x + 2)$	$y = (x + 2)(4 - x)$
$y = (x - 4)(2 - x)$	$y = (x - 8)(x - 2)$
$y = (x - 4)(x - 4)$	$y = (x + 8)(x - 2)$

CARD SET D

$y = (x + 3)^2 - 25$	$y = (x - 4)^2$
$y = (x - 5)^2 - 9$	$y = -(x - 3)^2 + 1$
$y = -(x - 1)^2 + 9$	$y = (x + 3)^2 - 1$
$y = (x - 3)^2 - 25$	Minimum at (3, –25)
Minimum at (–3, –1)	Maximum at (1, 9)

CARD SET E Intercepts with the axes

$x = 0, y = -16$	$x = 0, y = 16$
$x = 0, y = 16$	$x = 0, y = -8$
$x = 0, y = 8$	$x = 0, y = 8$
$x = 0, y = -16$	$y = 0, x = 8$ or -2
$y = 0, x = -4$ or -2	$y = 0, x = -2$ or 4
$y = 0, x = 4$ or 2	$y = 0, x = 8$ or 2
$y = 0, x = 4$	$y = 0, x = -8$ or 2

Adapted from the STANDARDS UNIT professional development materials produced by the UK Department for Education and Skills. Author Malcolm Swan.