(A) QUADRATIC FUNCTIONS 1 – complete Q's 2 to 6, 7a.

1. a) Make a table of values and graph each parabola on the same grid for $-5 \leq x \leq 5$.

   $y = x^2$ $\quad y = x^2 + 4$ $\quad y = x^2 + 7$

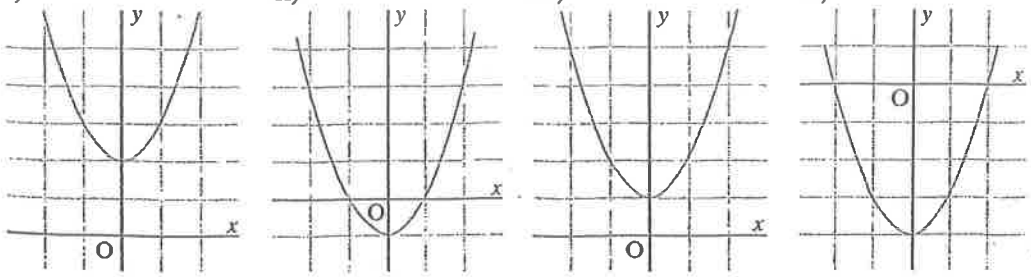
   $y = x^2 - 2$ $\quad y = x^2 - 5$ $\quad y = x^2 + 1$

   b) Describe the effect of various values of q on the graph of $y = x^2 + q$.

2. Which graph best represents each equation?

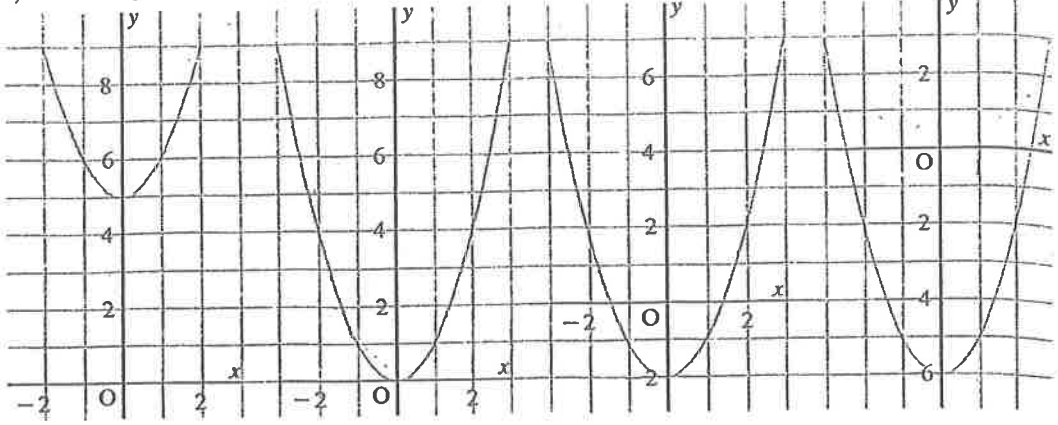
   a) $y = x^2 + 1$ b) $y = x^2 - 4$ c) $y = x^2 - 1$ d) $y = x^2 + 2$

   i) ii) iii) iv)



3. Write an equation that could correspond to each graph.

   a) b) c) d)

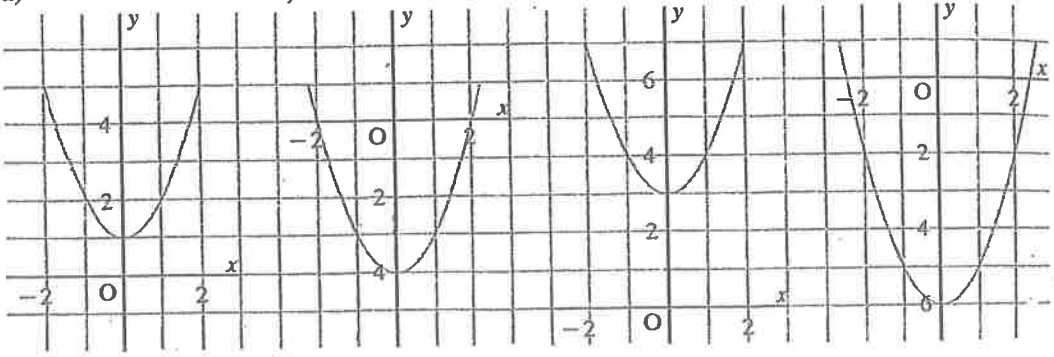


4. For each parabola state:

   i) the direction of opening ii) the coordinates of the vertex

   iii) the y-intercept iv) the x-intercepts (if any).

   a) b) c) d)



(B)

5. For each parabola state:

   i) the direction of opening ii) the coordinates of the vertex

   iii) the y-intercept iv) the x-intercepts (if any).

   a) $y = x^2 + 5$ b) $y = x^2 - 3$ c) $y = x^2 + 2$ d) $y = x^2 + 4$

6. Sketch each set of graphs on the same grid.

   a) $y = x^2 - 2$ $\quad y = x^2 + 1$ $\quad y = x^2 + 4$

   b) $y = x^2 - 1$ $\quad y = x^2 - 3$ $\quad y = x^2 + 2$

7. Find the equation of each parabola.

   a) with vertex (0, 2) through (−3, 11)

   b) with vertex (0, −9) and x-intercepts ± 3

   c) with vertex (0, 5) through (2, 9)

QUADRATIC FUNCTIONS 2 - complete Q's 3 to 8, 10a

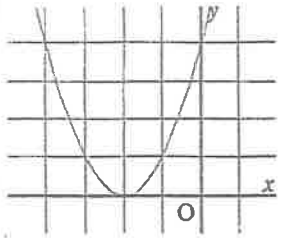
(A)

1. Sketch each set of graphs on the same grid.
   a) $y = x^2$ $y = (x - 2)^2$ $y = (x + 4)^2$
   b) $y = x^2$ $y = (x + 3)^2$ $y = (x - 6)^2$
   c) $y = x^2$ $y = (x - 4)^2$ $y = (x + 6)^2$

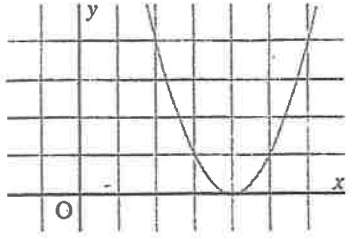
2. Compare the graphs of $y = x^2$ and $y = (x - p)^2$ when:
   a) $p < 0$ b) $p > 0$.

3. Which graph best represents each equation?
   a) $y = (x - 1)^2$ b) $y = (x + 2)^2$ c) $y = (x + 4)^2$ d) $y = (x - 4)^2$

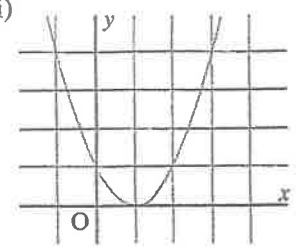
i)



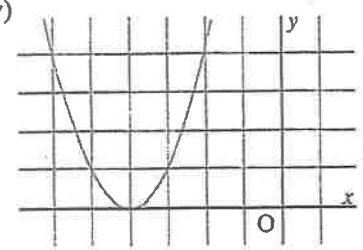
ii)



iii)

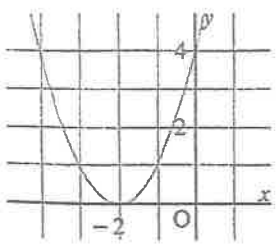


iv)

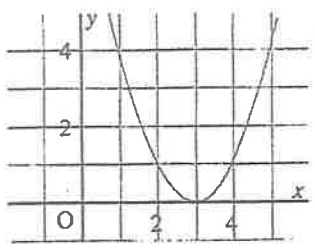


4. Write an equation that could correspond to each graph.

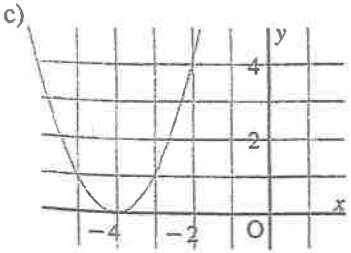
a)



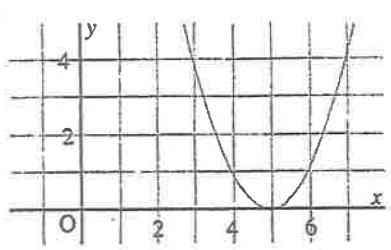
b)



c)

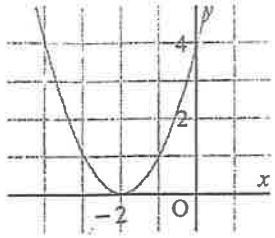


d)

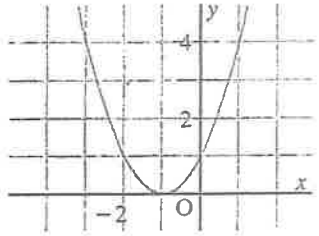


5. For each graph state:
   i) the coordinates of the vertex ii) the equation of the axis of symmetry
   iii) the direction of opening iv) the y-intercept

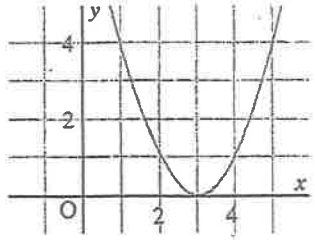
a)



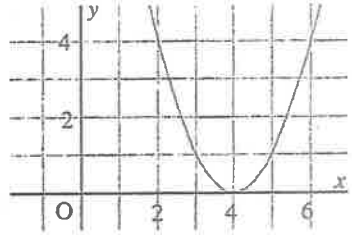
b)



c)



d)



(B)

6. State the equation of each parabola in *Exercise 5*.

7. For each parabola state:
   i) the coordinates of the vertex ii) the equation of the axis of symmetry
   iii) the direction of opening iv) the y-intercept
   a) $y = (x + 3)^2$ b) $y = (x - 8)^2$ c) $y = (x - 2)^2$ d) $y = (x + 4)^2$

8. Sketch the graphs of the parabolas in *Exercise 7*.

9. Sketch the graph of each parabola.
   a) $y = (x - 2)^2$ b) $y = (x + 5)^2$ c) $y = (x - 6)^2$ d) $y = (x + 2)^2$

10. Find the equation of each parabola.
    a) with vertex (4, 0), y-intercept 16
    b) with vertex $(-3, 0)$, y-intercept 9
    c) with x-intercept 7, y-intercept 49, axis of symmetry $x - 7 = 0$

(C)

11. Sketch each set of graphs on the same grid.
    a) $y = (x + 4)^2 + 1$ and $y = (x + 4)^2 - 3$
    b) $y = (x - 1)^2 + 2$ and $y = (x - 1)^2 - 2$
    c) $y = x^2 + 6x + 9$ and $y = x^2 + 6x$
    d) $y = (x - 10)^2$ and $y = (10 - x)^2$

QUADRATIC FUNCTIONS 3- complete Q's 1 to 3

(A)

1. a) Make a table of values and graph the equations on the same grid for $-5 \leq x \leq 5$.

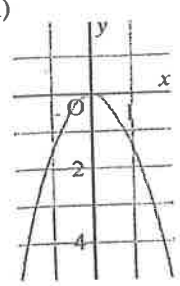
$y = x^2$ $\quad y = 3x^2$ $\quad y = \frac{1}{2}x^2$ $\quad y = -x^2$ $\quad y = -\frac{1}{3}x^2$ $\quad y = -4x^2$

b) Describe the effect on the graph of $y = ax^2$ as the value of a varies.

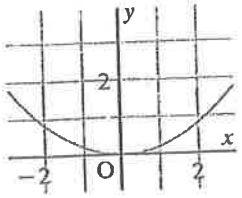
2. Which graph best represents each equation?

a) $y = 5x^2$ b) $y = 0.2x^2$ c) $y = -1.5x^2$ d) $y = -3x^2$

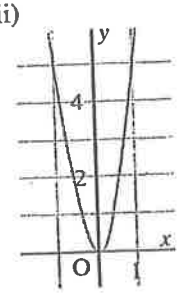
i)



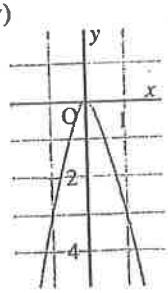
ii)



iii)



iv)



(B)

3. Sketch each set of parabolas on the same grid.

a) $y = x^2$ $\quad y = 3x^2$ $\quad y = \frac{1}{2}x^2$

b) $y = x^2$ $\quad y = -x^2$ $\quad y = 5x^2$ $\quad y = -3x^2$

c) $y = 2x^2$ $\quad y = \frac{3}{4}x^2$ $\quad y = -1.5x^2$ $\quad y = -4x^2$

d) $y = -2x^2$ $\quad y = \frac{1}{4}x^2$ $\quad y = 2.5x^2$ $\quad y = -\frac{1}{2}x^2$

4. Find the equation of the parabola with vertex (0, 0) which passes through each point.

a) (3, 18) b) (4, −16) c) (6, −9) d) (2, 24)

5. Find the equation of the parabola with vertex (0, 0) which passes through each point.

a) (2, −10) b) (3, 5) c) $\left(\frac{3}{2}, \frac{1}{3}\right)$ d) $(-\sqrt{2}, -6)$

(C)

6. The line $3x - y - 3 = 0$ is tangent to a parabola which has vertex (0, 0) and axis of symmetry the y-axis. Find the equation of the parabola.