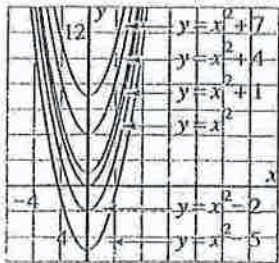Answer key! playing with $y = x^2$

QUAD. FUNC. 2

4
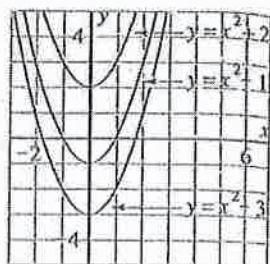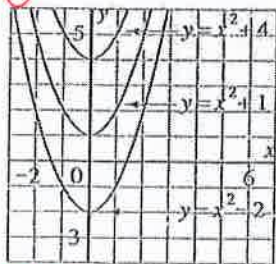
ANSWERS
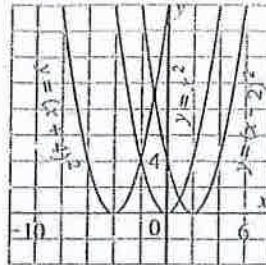QUADRATIC
FUNCTIONS 1

**1. a)**



**b)** The vertex is on the $y$-axis. When $q$ is positive, the vertex is $q$ units above the $x$-axis. When $q$ is negative, it is $q$ units below the $x$-axis.

**2. a)** iii   **b)** iv   **c)** ii   **d)** i

**3. a)** $y = x^2 + 5$   **b)** $y = x^2$   **c)** $y = x^2 - 2$
**d)** $y = x^2 - 6$

**4. a) i)** up   **ii)** (0, 1)   **iii)** 1
**b) i)** up   **ii)** (0, −4)   **iii)** −4   **iv)** ±2
**c) i)** up   **ii)** (0, 3)   **iii)** 3
**d) i)** up   **ii)** (0, −6)   **iii)** −6   **iv)** ±2.5

**5. a) i)** up   **ii)** (0, 5)   **iii)** 5
**b) i)** up   **ii)** (0, −3)   **iii)** −3   **iv)** ±1.7
**c) i)** up   **ii)** (0, 2)   **iii)** 2
**d) i)** up   **ii)** (0, 4)   **iii)** 4

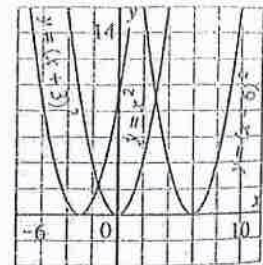**6. a)**   **b)**



**7. a)** $y = x^2 + 2$   **b)** $y = x^2 - 9$
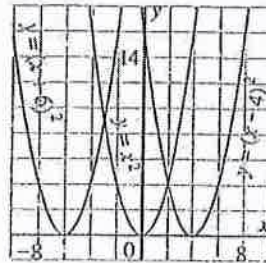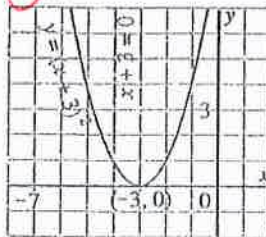**c)** $y = x^2 + 5$

**1. a)**   **b)**



**c)**



**2. a)** When $p < 0$, the graph of $y = (x - p)^2$ is to the left of that of $y = x^2$.
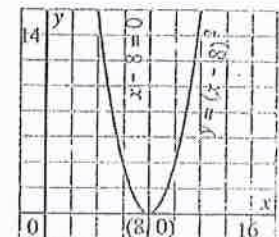**b)** When $p > 0$, the graph of $y = (x - p)^2$ is to the right of that of $y = x^2$.

**3. a)** iii   **b)** i   **c)** iv   **d)** ii

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

**5. a) i)** (−2,0)   **ii)** $x + 2 = 0$   **iii)** up
**iv)** 4
**b) i)** (−1,0)   **ii)** $x + 1 = 0$   **iii)** up
**iv)** 1
**c) i)** (3,0)   **ii)** $x - 3 = 0$   **iii)** up   **iv)** 9
**d) i)** (4,0)   **ii)** $x - 4 = 0$   **iii)** up   **iv)** 16

**6. a)** $y = (x + 2)^2$   **b)** $y = (x + 1)^2$
**c)** $y = (x - 3)^2$   **d)** $y = (x - 4)^2$

**7. a) i)** (−3,0)   **ii)** $x + 3 = 0$   **iii)** up
**iv)** 9
**b) i)** (8,0)   **ii)** $x - 8 = 0$   **iii)** up   **iv)** 64
**c) i)** (2,0)   **ii)** $x - 2 = 0$   **iii)** up   **iv)** 4
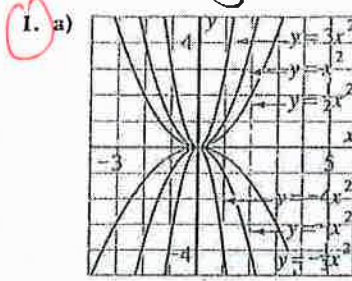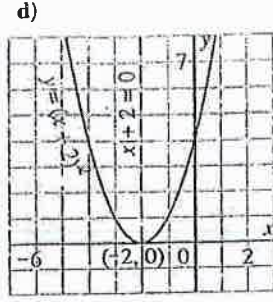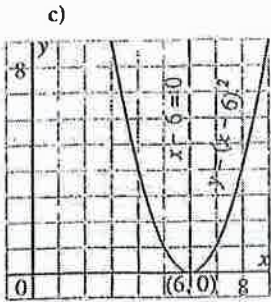**d) i)** (−4,0)   **ii)** $x + 4 = 0$   **iii)** up
**iv)** 16

**8. a)**   **b)**



**c)**   **d)**



**9. a)**   **b)**

**c)**



**d)**



**10. a)** $y = (x - 4)^2$    **b)** $y = (x + 3)^2$
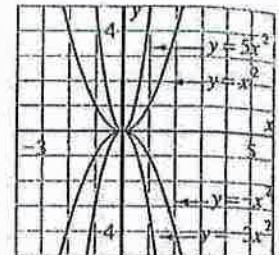**c)** $y = (x - 7)^2$

**11. a)**


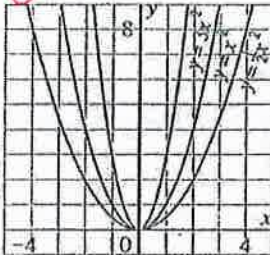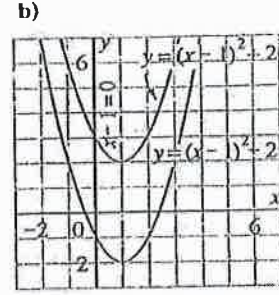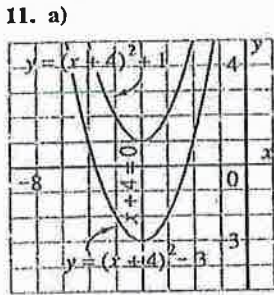
**b)**



**c)**



**d)**



**1. a)**
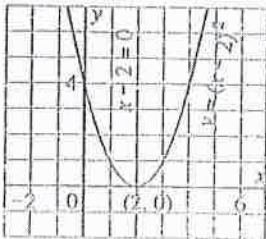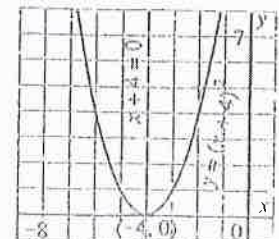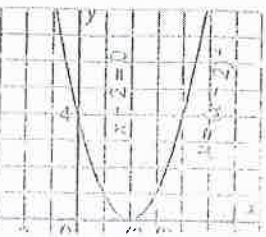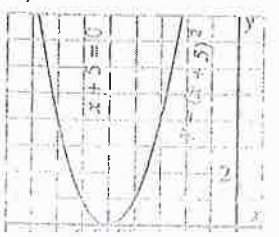


**b)** The parabola is expanded more:
as $a$ increases when $a > 0$; and as $a$ decreases
when $a < 0$.

**2. a)** iii    **b)** ii    **c)** i    **d)** iv

**3. a)**



**b)**



**c)**



**d)**
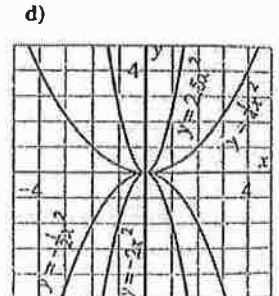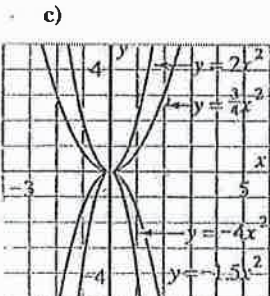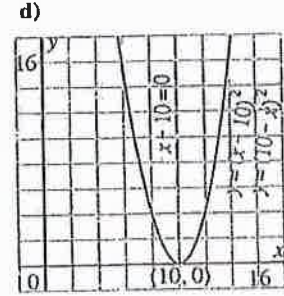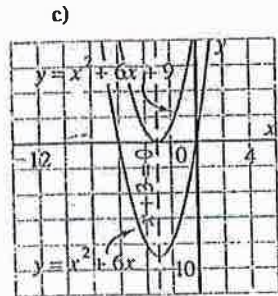


**4. a)** $y = 2x^2$    **b)** $y = -x^2$    **c)** $y = -\frac{1}{4}x^2$
**d)** $y = 6x^2$

**5. a)** $y = -2.5x^2$    **b)** $y = \frac{5}{9}x^2$    **c)** $y = \frac{4}{27}x^2$
**d)** $y = -3x^2$

**6.** $y = \frac{3}{4}x^2$