Name _____ Date _____

Zeros, Axis of Symmetry and Vertex from Factored Form

Directions: Each question is about a quadratic function in factored form, $y = a(x - p)(x - q)$ with a not equal to 0, or one you factor first. Points are written as ordered pairs (x, y), and a vertex can be checked by substituting its x-value.

1. Match each function to its zeros.

Write the letter of the matching answer on each line.

1. _____ $y = (x - 3)(x + 5)$
2. _____ $y = 2(x + 3)(x - 5)$
3. _____ $y = -(x - 3)(x - 5)$
4. _____ $y = x(x + 5)$

A. $x = 3$ and $x = 5$
B. $x = -3$ and $x = -5$
C. $x = 0$ and $x = -5$
D. $x = 2$, $x = -3$ and $x = 5$
E. $x = -3$ and $x = 5$
F. $x = 3$ and $x = -5$

2. Why are $x = 2$ and $x = -6$ the zeros of $y = 4(x - 2)(x + 6)$?

A. The 4 in front is also a zero, along with 2 and -6.
B. The zeros are always the numbers in the parentheses, with the same signs.
C. y is 0 exactly when $x - 2$ or $x + 6$ is 0, because 4 is not 0.
D. A product is 0 only when every one of its factors is 0.

3. The function $y = (x - 1)(x - 9)$ has its axis of symmetry along the line $x = c$. What is c?

_____

4. What is the vertex of $y = 2(x - 1)(x - 7)$, written as (x, y)?

A. $(4, -18)$ B. $(-4, -18)$ C. $(4, -9)$ D. $(-18, 4)$

5. Is the vertex of $y = -3(x + 1)(x - 5)$ a maximum or a minimum, and where is it? Points are written as (x, y).

A. A minimum at (2, 27), because $a = -3$ is negative
B. A maximum at $(2, -27)$, because $a = -3$ is negative
C. A maximum at (2, 27), because $a = -3$ is negative, so the parabola opens down
D. A minimum at $(-2, -27)$, because the zeros are -1 and 5

6. Match each function to its vertex, written as (x, y).

Write the letter of the matching answer on each line.

1. _____ $y = (x - 4)(x + 2)$
2. _____ $y = -(x - 4)(x + 2)$
3. _____ $y = 2(x - 4)(x + 2)$
4. _____ $y = (x + 4)(x - 2)$

A. $(1, -8)$
B. $(-1, -9)$
C. $(1, -18)$
D. $(-1, 9)$
E. $(1, 9)$
F. $(1, -9)$

7. Factor $x^2 - 3x - 40$ to find the zeros of $y = x^2 - 3x - 40$. What is the positive zero?

_____

8. Which statements about $y = -2(x - 3)(x + 1)$ are true? Points are written as (x, y). Select the three true statements.

☐ A. The axis of symmetry is $x = 1$.

☐ B. The vertex is (1, 8).

☐ C. The y-intercept is $(0, -6)$.

☐ D. The vertex is a minimum.

☐ E. The zeros are $x = 3$ and $x = -1$.