pmath 11 midterm practice 4.1-4.5

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. For a quadratic function, which characteristic of its graph is equivalent to the zero of the function?
   A. minimum point
   B. maximum point
   C. x-intercept
   D. y-intercept

2. Identify the y-intercept of the graph of this quadratic function: $y = -3(x+3)^2 + 4$
   A. 23
   B. 13
   C. –27
   D. –23

3. Use graphing technology to approximate the solution of this equation: $2x^2 - 3x - 4 = 0$
   Write the roots to 1 decimal place.
   A. The roots are approximately $x = 2.4$ and $x = -0.9$.
   B. The roots are approximately $x = 1.6$ and $x = -1.6$.
   C. The roots are approximately $x = 0.9$ and $x = -2.4$.
   D. The roots are approximately $x = 4.7$ and $x = -1.7$.

4. Which statement is NOT true for the graph of $y = x^2 + q$?
   A. When q is positive, the graph lies above the x-axis.
   B. As q increases, the graph moves up.
   C. When q is negative, the vertex is above the x-axis.
   D. The graph has the same size and shape as the graph of $y = x^2$.

5. Identify the coordinates of the vertex and the y-intercept of the graph of this quadratic function:
   $y = (x-2)^2 - 3$
   A. vertex: (2, 3); y-intercept: 1
   B. vertex: (2, –3); y-intercept: 1
   C. vertex: (–2, –3); y-intercept: 1
   D. vertex: (–2, 3); y-intercept: 4

6. Determine an equation of a quadratic function with the given characteristics of its graph: coordinates of the vertex: V(0, 2); passes through A(–2, –18)
   A. $y = -2x^2 + 2$
   B. $y = -18x^2 - 2$
   C. $y = -5x^2 - 2$
   D. $y = -5x^2 + 2$

7. Which equation represents the same quadratic function as $y = (x+3)^2 - 1$?
   A. $x^2 - 2x + 8$
   B. $x^2 + 6x + 8$
   C. $x^2 + 8x + 6$
   D. $x^2 - 6x + 8$

8. Write $y = -5x^2 + 30x - 41$ in standard form, then identify the coordinates of the vertex.
   A. $y = -5(x-3)^2 - 4$; vertex: (3, 4)
   B. $y = -5(x+3)^2 + 4$; vertex: (3, –4)
   C. $y = -5(x-3)^2 + 4$; vertex: (3, 4)
   D. $y = 2(x+3)^2 + 4$; vertex: (3, 4)

Short Answer

1. Use a graphing calculator to graph the quadratic function $y = -3x^2 - 3x + 3$.
   Write your answers to the nearest hundredth, if necessary.
   Determine:
   a) the intercepts

   b) the coordinates of the vertex

   c) the equation of the axis of symmetry

   d) the domain of the function

   e) the range of the function

2. Use graphing technology to approximate the solution of this equation: $-2x^2 + 4x + 5 = 0$
   Write the roots to 1 decimal place.

3. Determine an equation of a quadratic function with x-intercepts of –3 and 5, that passes through the point A(4, –21).

4. Write this equation in standard form: $y = x^2 + 8x - 9$

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Answer Section

MULTIPLE CHOICE

1. ANS: C DIF: Easy REF: 4.1 Properties of a Quadratic Function
2. ANS: D DIF: Easy REF: 4.1 Properties of a Quadratic Function
3. ANS: A DIF: Easy REF: 4.2 Solving a Quadratic Equation Graphically
4. ANS: C DIF: Easy REF: 4.3 Transforming the Graph of y = x^2
5. ANS: B DIF: Easy
   REF: 4.4 Analyzing Quadratic Functions of the Form y = a(x - p)^2 + q
6. ANS: D DIF: Moderate
   REF: 4.4 Analyzing Quadratic Functions of the Form y = a(x - p)^2 + q
7. ANS: B DIF: Easy
   REF: 4.5 Equivalent Forms of the Equation of a Quadratic Function
8. ANS: C DIF: Moderate
   REF: 4.5 Equivalent Forms of the Equation of a Quadratic Function

SHORT ANSWER

1. ANS:
   a) x-intercepts: –1.62 and 0.62
      y-intercept: 3
   b) vertex: (–0.5, 3.75)
   c) axis of symmetry: $x = –0.5$
   d) domain: $x \in \mathbb{R}$
   e) range: $y \leq 3.75, y \in \mathbb{R}$

   DIF: Moderate REF: 4.1 Properties of a Quadratic Function
2. ANS:
   The roots are approximately $x = –0.9$ and $x = 2.9$.

   DIF: Easy REF: 4.2 Solving a Quadratic Equation Graphically
3. ANS:
   $y = 3(x – 1)^2 – 48$

   DIF: Difficult REF: 4.4 Analyzing Quadratic Functions of the Form y = a(x - p)^2 + q
4. ANS:
   $y = (x + 4)^2 – 25$

   DIF: Moderate REF: 4.5 Equivalent Forms of the Equation of a Quadratic Function