1. 060514b, P.I. A.A.41
For which quadratic equation is the axis of symmetry $x = 3$?

[A] $y = x^2 + 6x + 3$ [B] $y = -x^2 + 6x + 2$

[C] $y = -x^2 + 3x + 5$ [D] $y = x^2 + x + 3$

2. 060918ia, P.I. A.A.41
What are the vertex and axis of symmetry of the parabola $y = x^2 - 16x + 63$?

[A] vertex: (-8,1); axis of symmetry: x = -8

[B] vertex: (8,-l); axis of symmetry: $x = 8$

[C] vertex: (8,1); axis of symmetry: $x = 8$

[D] vertex: (-8,-1); axis of symmetry: x = -8

3. 080501b, P.I. A.A.41
What is the turning point, or vertex, of the parabola whose equation is $y = 3x^2 + 6x - 1$?

[A] (-3,8) [B] (3,44)

[C] (1,8) [D] (-l,-4)

4. 080603b, P.I. A.A.41
What is the minimum point of the graph of the equation $y = 2x^2 + 8x + 9$?

[A] (2,17) [B] (-2,1)

[C] (-2,-15) [D] (2,33)

5. 080902b, P.I. A.A.41
What are the coordinates of the turning point of the parabola whose equation is $y = -x^2 + 4x + 1$?

[A] (2,13) [B] (2,5)

[C] (-2,-11) [D] (-2,-3)

6. 080934ia, P.I. A.A.41
Find algebraically the equation of the axis of symmetry and the coordinates of the vertex of the parabola whose equation is $y = -2x^2 - 8x + 3$.

7. fall9915b, P.I. A.A.41
A model rocket is launched from ground level. Its height, h meters above the ground, is a function of time t seconds after launch and is given by the equation $h = -4.9t^2 + 68.6t$. What would be the maximum height, to the *nearest meter*, attained by the model?

[A] 243 [B] 241 [C] 242 [D] 240

8. 010907b, P.I. A.A.41
The height of a swimmer's dive off a 10-foot platform into a diving pool is modeled by the equation $y = 2x^2 - 12x + 10$, where x represents the number of seconds since the swimmer left the diving board and y represents the number of feet above or below the water's surface. What is the farthest depth below the water's surface that the swimmer will reach?

[A] 12 feet [B] 10 feet
[C] 6 feet [D] 8 feet

9. 010322b
The height of an object, $h(t)$, is determined by the formula $h(t) = -16t^2 + 256t$, where t is time, in seconds. Will the object reach a maximum or a minimum? Explain or show your reasoning.

10. 060321b
Vanessa throws a tennis ball in the air. The function $h(t) = -16t^2 + 45t + 7$ represents the distance, in feet, that the ball is from the ground at any time t. At what time, to the *nearest tenth of a second*, is the ball at its maximum height?

11. 080321b
The height, h, in feet, a ball will reach when thrown in the air is a function of time, t, in seconds, given by the equation $h(t) = -16t^2 + 30t + 6$. Find, to the *nearest tenth*, the maximum height, in feet, the ball will reach.

12. 010424b, P.I. A.A.41
When a current, I, flows through a given electrical circuit, the power, W, of the circuit can be determined by the formula $W = 120I - 12I^2$. What amount of current, I, supplies the maximum power, W?

13. 060225b, P.I. A.A.41
The equation $W = 120I - 12I^2$ represents the power (W), in watts, of a 120-volt circuit having a resistance of 12 ohms when a current (I) is flowing through the circuit. What is the maximum power, in watts, that can be delivered in this circuit?

14. 060101b
An archer shoots an arrow into the air such that its height at any time, t, is given by the function $h(t) = -16t^2 + kt + 3$. If the maximum height of the arrow occurs at time $t = 4$, what is the value of k?

[A] 4 [B] 64 [C] 8 [D] 128

[1] B

[2] B

[3] D

[4] B

[5] B

[3] $x = -2$ and $(-2,11)$, and appropriate algebraic work is shown.
[2] Appropriate work is shown, but one computational error is made.
or [2] An incorrect equation of the axis of symmetry is written, but an appropriate vertex is found.
or [2] $x = -2$ and $y = 11$, and appropriate work is shown, but the vertex is not stated as a point.
[1] Appropriate work is shown, but two or more computational errors are made.
or [1] Appropriate work is shown, but one conceptual error is made, such as not expressing the axis of symmetry as an equation.
or [1] $x = -2$ and $(-2,11)$, but a method other than algebraic is used.
or [1] Appropriate work is shown to find $x = -2$, but no further correct work is shown.
or [1] Appropriate work is shown to find $(-2,11)$, but no further correct work is shown.
or [1] $x = -2$ and $(-2,11)$, but no work is shown.
[0] $x = -2$ or $(-2,11)$, but no work is shown.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[6] obviously incorrect procedure.

[7] D

[8] D

[2] Maximum, and an appropriate reason is given, such as the value of a is negative (less than 0) or the graph opens downward.
[1] Minimum, but an appropriate reason is given, based on an incorrect equation, such as an error in finding the axis of symmetry.
[0] Maximum or minimum, but no reason or an inappropriate reason is given.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[9] obviously incorrect procedure.

[2] 1.4, and appropriate work is shown, such as finding the axis of symmetry.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] 1.4, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[10] incorrect procedure.

[2] 20.1, and appropriate work is shown.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] The time when the ball reaches its maximum height is found correctly, but no further correct work is shown.
or [1] 20.1, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[11] incorrect procedure.

[2] 5, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 5, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[12] incorrect procedure.

[2] 300, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] 300, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[13]

[14] D