1. Find the standard form of the quadratic function shown below:

\[ f(x) = - (x + 1)^2 + 3 \]

A) \[ f(x) = -(x + 1)^2 + 3 \]
B) \[ f(x) = -\frac{1}{4}(x + 1)^2 + 3 \]
C) \[ f(x) = -(1 - x)^2 + 3 \]
D) \[ f(x) = -\frac{3}{4}(x + 1)^2 + 3 \]
E) \[ f(x) = -\frac{3}{4}(x - 1)^2 + 3 \]

2. Determine the vertex of the graph of the quadratic function \[ f(x) = x^2 + 5x + \frac{29}{4} \].

A) \[ \left(-\frac{5}{2}, \frac{27}{2}\right) \]
B) \[ \left(\frac{5}{2}, \frac{29}{4}\right) \]
C) \[ \left(\frac{5}{2}, \frac{29}{4}\right) \]
D) \[ \left(-\frac{5}{2}, \frac{21}{4}\right) \]
E) \[ \left(-\frac{5}{2}, 1\right) \]
3. Find two positive real numbers whose product is a maximum and whose sum of the first number and four times the second is 240.
   A) 192, 12  
   B) 136, 26  
   C) 128, 28  
   D) 120, 30  
   E) 96, 36

4. The height, \( h(x) \), of a punted rugby ball is given by  
   \[ h(x) = -\frac{1}{64}x^2 + \frac{17}{32}x + 2 \]  
   where \( x \) is the horizontal distance in feet from the point where the ball is punted. How far, horizontally, is the ball from the kicker when it is at its highest point?
   A) 17 feet  
   B) 22 feet  
   C) 36 feet  
   D) 20 feet  
   E) 27 feet

5. From the graph of the quadratic function \( f(x) = -x^2 + 2x + 8 \), determine the equation of the axis of symmetry.
   A) \( x = -2 \)  
   B) \( x = 7 \)  
   C) \( x = 8 \)  
   D) \( x = 1 \)  
   E) \( x = 9 \)
6. Compare the graph of \( t(x) = \left[ -\frac{1}{2} (x + 6) \right]^2 - 1 \) with \( t(x) = x^2 \).

A) \( t(x) = \left[ -\frac{1}{2} (x + 6) \right]^2 - 1 \) shifts right 6 units, shifts downward 1 units, and shrinks by a factor of \( \frac{1}{4} \).

B) \( t(x) = \left[ -\frac{1}{2} (x + 6) \right]^2 - 1 \) shifts right 36 units, shifts upward 1 units, and shrinks by a factor of \( \frac{1}{4} \).

C) \( t(x) = \left[ -\frac{1}{2} (x + 6) \right]^2 - 1 \) shifts left 6 units, shifts downward 1 units, and shrinks by a factor of \( \frac{1}{4} \).

D) \( t(x) = \left[ -\frac{1}{2} (x + 6) \right]^2 - 1 \) shifts right 6 units, shifts upward 1 units, and shrinks by a factor of \( \frac{1}{4} \).

E) \( t(x) = \left[ -\frac{1}{2} (x + 6) \right]^2 - 1 \) shifts left 36 units, shifts upward 1 units, and shrinks by a factor of \( \frac{1}{2} \).

7. Write the quadratic function, \( f(x) = \frac{1}{8} (x^2 + 16x + 48) \), in standard form.

A) \( f(x) = \frac{1}{8} (x + 8)^2 - 2 \)

B) \( f(x) = -\frac{1}{2} (x + 8)^2 - 2 \)

C) \( f(x) = \frac{1}{8} (x - 2)^2 + 8 \)

D) \( f(x) = \frac{1}{8} (x - 8)^2 + 2 \)

E) \( f(x) = -\frac{1}{2} (x - 8)^2 - 2 \)
8. Determine the x-intercept(s) of the quadratic function \( f(x) = x^2 + 8x + 15 \).
   A) \((-5,0),(-3,0)\)
   B) \((9,0),(2,0)\)
   C) \((5,0),(3,0)\)
   D) \((-9,0),(-2,0)\)
   E) no x-intercept(s)

9. Write the standard form of the equation of the parabola that has a vertex at \( \left(-\frac{2}{3},\frac{1}{9}\right) \) and passes through the point \((3,1)\).
   A) \(f(x) = \frac{8}{11} \left(x + \frac{2}{3}\right)^2 + \frac{1}{9}\)
   B) \(f(x) = \frac{8}{121} \left(x - \frac{3}{2}\right)^2 + \frac{1}{9}\)
   C) \(f(x) = \frac{8}{121} \left(x + \frac{2}{3}\right)^2 + \frac{1}{9}\)
   D) \(f(x) = \frac{8}{11} \left(x - \frac{2}{3}\right)^2 - \frac{1}{9}\)
   E) \(f(x) = \frac{8}{25} \left(x - \frac{3}{2}\right)^2 - \frac{1}{9}\)

10. A farmer has 288 feet of fencing and wants to build two identical pens for his prize-winning pigs. The pens will be arranged as shown. Determine the dimensions of a pen that will maximize its area.
   A) 36' × 48'
   B) 36' × 96'
   C) 33' × 76'
   D) 16' × 248'
   E) 12' × 144'
Answer Key

1. D
2. E
3. D
4. A
5. D
6. C
7. A
8. A
9. C
10. A