Functions Worksheet 5 - Answers

1. Find the coordinates for the vertex of the parabola $y = 2x^2 - 12x + 4$
   Vertex: $(3, -7)$

2. Find the x-intercepts of $y = 7x^2 - 5x$.
   $0, -\frac{5}{7}$.

3. Solve $x^2 - 5x + 6 = 0$.
   $x = 3$ and $x = 2$.

4. Complete the square to solve $x^2 - 6x - 2 = 0$ for x.
   $(x-3)^2 = 11 \implies x = -3 \pm \sqrt{11}$.

5. Solve $3x^2 - 5x + 1 = 0$.
   $x = \frac{5 \pm \sqrt{13}}{6}$.

6. If we write the equation for the height of an object during projectile motion as $h(t) = -5t^2 + 3t$. At what time will the object be at the highest point in its trajectory?
   $t = \frac{3}{10}$ seconds.

7. The quantity of a car C after time t can be written $C(t) = 1.02^t$. Is the quantity of the car growing or decaying? Identify the percent rate of change from the equation for $C(t)$
   C is growing at a rate of 2% for each time interval t.

8. If we write Kinetic Energy (KE) as $KE(v) = \frac{1}{2}mv^2$, we know that the vertex exists at $v = 0$. Rewrite the equation assuming an additional velocity of 5 m/s.
   $KE(v) = \frac{1}{2}m(v+5)^2$.

9. The quantity of a porcelain doll after time t can be written $D(t) = 50(0.97)^t$. Is the quantity of the doll growing or decaying? Identify the percent rate of change from the equation for $D(t)$.
   The doll's quality is decaying at a rate of 3% for each time interval t.

10. What are the coordinates of the vertex of $y = -3x^2 + 6x + 15$? Is the vertex a maximum or a minimum?
    Vertex: $(1, 18)$ is a maximum.
