1. A person standing close to the edge at the top of a 200 foot building throws a baseball vertically upward. The quadratic function $s(t) = -16t^2 + 64t + 200$ models the ball’s height above the ground $s(t)$ in feet $t$ seconds after it was thrown.
   a) What is the maximum height the ball reaches?
   b) How many seconds does it take until the ball hits the ground?
   c) Calculate $s(0)$ and describe what it represents.

2. Solve the following equation for $x$: $\sqrt{2x + 9} - 8 = x$

3. Consider the function $f(x) = 4 - x^2$
   a) Find and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$
   b) If $g(x) = x + 5$, find $(f \circ g)(x)$.
   c) What is the domain of the function $(f \circ g)(x)$? Give your solution in interval notation.

4. Consider the following graph of a function $h(x)$:
   a) On what intervals is $h(x)$ increasing and decreasing?
   b) Sketch the graph of $h(x+1) + 2$
   c) What is the domain of $h(x)$?
   d) Find $h(3)$.
   e) Is $h(4)$ a relative maximum?

5. Find the inverse of $f(x) = (x + 2)^3$ and show that your answer is in fact an inverse.

6. Find the equation of a line that passes through the points (1,2) and (5,10).

7. Solve the linear inequality $7 - \frac{4}{5}x < \frac{3}{5}$. Give your solution in interval notation.
8. Solve the following polynomial by factoring: $3x^4 = 48x^2$

9. Find the domain of the following functions:
   
   a) $f(x) = \sqrt{x-1}$
   
   b) $g(x) = \frac{2}{x^2 + x - 12}$

10. Consider the following:

    a) Which of the above lines has the greatest slope?
    
    b) Which of the above lines has the greatest y-intercept?
Formulas for exam 2:

- The vertex of a parabola defined by \( f(x) = ax^2 + bx + c \) is \( \left( -\frac{b}{2a}, f\left(-\frac{b}{2a}\right) \right) \)
- Point Slope equation of a line: \( y - y_i = m(x - x_i) \)