

Assignment 7

Question 1. [2 marks] Which of the following functions are linear, quadratic, or neither? If the function is linear find its slope and its y -intercept. Is it increasing or decreasing? If the function is quadratic, is it concave up or concave down, what is its y -intercept?

(a) $y = (x - 5)^2 - 7$;

(b) $y = (x + 3)^5 - 1$;

(c) $y = -19$;

(d) $y^2 = x^2 + 7$;

(e) $y = -x^2 + 4x - \frac{2}{3}$;

(f) $y + x^2 = 0$;

(g) $y = \frac{5}{2}x + x^2$;

(h) $y = 99 - x$.

Question 2. [2 marks] Sketch the graph of the function $y = \frac{x}{2} - 1$. Write the formula for the inverse of this function and sketch the graph of the inverse in the same coordinate system.

Question 3. [2 marks] Find the equation of the straight line that passes through the points $(\frac{3}{2}, 1)$ and $(-\frac{3}{2}, 4)$. Check your solution.

Question 4. [2 marks]

(a) Sketch the graph of the function $y = x^2$.

(b) Sketch the graph of the function $y = (x + 1)^2 = (x - (-1))^2$.

(c) Sketch the graph of the function $y = (x + 1)^2 - 2$.

(d) Give the coordinates of the vertex of the parabola from part (c).

(e) Convert the vertex form from part (c) into the general form of a quadratic function.

Question 5. [2 marks] Consider the function given by the formula $y = (x + 1)^2$ on the domain $x \geq -1$ with the codomain $[0, \infty)$. Is this function invertible? If yes, find the inverse.

Question 6.

(a) [2 marks] Solve the equation $x^2 - 4x + 5 = 0$.

(b) [2 marks] Find the vertex of the parabola $y = x^2 - 4x + 5$. Is the vertex the maximum or the minimum of this quadratic function?

Question 7. [2 marks] Sketch the graph of the function $y = x^2 - 4x + 5$. Use the results of Q6.

Question 8. Decide if the graph of the function

$$y = -x^2 - 3x + 1$$

is a concave up or concave down parabola. Find the x - and y -intercepts. Sketch the graph of the function