Quiz 5 (Review Chapter 1 - 2.2)

Write an equation of the line passing through these points.

1) \((4, 2)\) and \((-3, 2)\)

Horizontal line
\[y = 2\]

Given the function below, write the equation of the line parallel to the given line through the given point.

2) \(2x + 6y = 12\)
\[x + 3y = 6\]
\[y = \frac{-1}{3}x + 2\]
\[
\begin{align*}
\text{Perpendicular line so } m &= 3 \\
(y - 4) &= 3(x - 0) \\
y &= 3x + 4
\end{align*}
\]

Sketch the graph of \(f(x)\) and \(g(x)\) and describe how \(g(x)\) is related to the graph of \(f(x)\).
(Example: Shifted to the left, right, up, down, reflected over \(x\) or \(y\), etc.)

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

For the function \(p(x)\), determine the vertex.

4) \(p(x) = x^2 + 2x + 1\)
\[a = \frac{-b}{2a} = \frac{-2}{2 \cdot 1} = -1\]
\[b = p(-1) = (-1)^2 + 2(-1) + 1 = 1 - 2 + 1 = 0\]
Vertex \((-1, 0)\)

Given the function \(h(x)\), determine the x-intercepts.

5) \(h(x) = x^2 - 4x - 5\)
\[(x - 5)(x + 1)\]
\[x = 5, \quad x = -1\]
Use the Leading Coefficient Test to describe the right-hand and left-hand behavior of the graph of the polynomial function.

6) \( f(x) = \frac{1}{2}x^4 + x^3 - 4 \)

\( \text{Degree} > 4 \quad \text{Even} \)

\( \text{L.C.} = \frac{1}{2} \quad a > 0 \)

\( \Rightarrow \) rises left & right

Find all the zeros of the polynomial function and determine their multiplicity. Use the Leading Coefficient test and two other points to sketch the graph.

7) \( g(x) = x^4 - 16x^2 \)

\( = x^2(x^2 - 16) \)

\( x = 0 \) multiplicity 2

\( x = 4 \) mult 1

\( x = -4 \) mult 1

3) Zeros and their multiplicity:

Two other points:

\( g(-1) = (-1)^4 - 16(-1)^2 = 1 - 16 = -15 \)

\( g(1) = (1)^4 - 16(1)^2 = 1 - 16 = -15 \)

Graph:

Bonus: Given \( f(x) = 14x - 3 \) and \( g(x) = 8x^2 \), determine \( f(g(2)) \)

\( f(g(2)) = f(8(2)^2) = f(32) = 14(32) - 3 = 445 \)