

Math 102 Quiz #2 Fall 2007

B Noble

1. Let $p(x) = x^2(x - 3)(x + 4)$.

a. (2 pts) What is the domain of $p(x)$?
 $(-\infty, \infty)$

b. (3 pts) Find the zero(s) of $p(x)$. Write them as ordered pairs (x, y) .
 $(0, 0)$, $(3, 0)$, $(-4, 0)$

c. (3 pts) Determine whether the graph of $p(x)$ crosses or touches at each x-intercept.
crosses at $(3, 0)$ and at $(-4, 0)$; touches at $(0, 0)$.

d. (2 pts) Find the y-intercept. Write it as an ordered pair (x, y) .
 $(0, 0)$.

e. (1 pt) What is the degree of $p(x)$?
4

f. (1 pt) What is the maximum number of turning points in the graph of $p(x)$?
 $4 - 1 = 3$ turning points.

g. (2 pts) Describe the end behavior of $p(x)$ graphically or analytically.
As $x \rightarrow \infty$, $y \rightarrow \infty$, and as $x \rightarrow -\infty$, $y \rightarrow \infty$.

h. (6 pts) Use the above information and additional test points (as needed) to sketch the graph of $p(x)$. These points should be labeled on your graph.
Neatness counts!

2. Let $R(x) = \frac{2x-6}{x}$.

a. (2 pts) What is the domain of $R(x)$?

$(-\infty, 0) \cup (0, \infty)$

b. (2 pts) Identify any x-intercept(s), if there are any. If so, write them as ordered pairs (x, y) .

Set $R(x) = 0$, and solving for x , gives us $(3, 0)$

c. (2 pts) Identify the y-intercept, if there is one. If so, write it as an ordered pair (x, y) .

There is no y-intercept because $x = 0$ is not in the domain of $R(x)$.

d. (2 pts) Find the equation(s) of the vertical asymptotes.

$x = 0$

e. (3 pts) Find the equation of the horizontal/oblique asymptote.

$y = 2$

f. (3 pts) Determine whether the graph of $R(x)$ intersects the horizontal/oblique asymptote.

Set $\frac{2x-6}{x} = 2$, and solve for x . Simplifying, we obtain the statement $0 = -6$, which is never true. This means that the graph of $R(x)$ never intersects the horizontal asymptote.

g. (6 pts) Use the above information and additional test points (as needed) to sketch the graph of $p(x)$. These points should be labeled on your graph.

Neatness counts!