Math 1075: Midterm Exam 3

Instructions:

- Show ALL work to receive full credit. Answers with insufficient supporting work will receive little or no credit.

- Please CIRCLE your answers

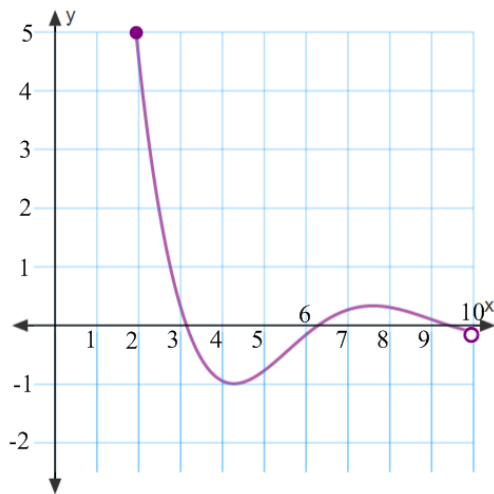| Page	1	2	3	4	5	6	7	Total
Maximum Points	16	14	14	14	12	12	18	100
Student Score								

1. Find the domain and range of each of the following functions. Give your answers in interval notation.

(4 points each)

a. $f(x)=\sqrt{17-x}$

b. $h(x)=|x-5|-6$

c. $g(x)=\sqrt[7]{2x+9}$

d. The graph of $y=k(x)$ is given below

2. Given the points $(-3,-2)$ and $(6,-5)$:

   a. Find the slope of the line that passes through both points.   (5 points)

   b. Determine the equation of the line (in $f(x)=mx+b$ form) that passes through both points.

            (5 points)

   c) Determine the equation of the line (in $f(x)=mx+b$ form) perpendicular to your line from part b) that passes through the point $(0,7)$.   (4 points)

3. Use the function $F(x) = -|x-9| + 8$ to answer the questions below.

   a. Find $F(-11)$, $F(2)$, and $F(12)$.   (6 points)

   b. Determine the *y*-intercept of $F(x)$.   (2 points)

   c. Determine the *x*-intercepts of $F(x)$.   (6 points)

4. The function $p(x) = -50x^2 + 7,000x - 65,000$ give the profit (in dollars) for producing and selling x tons of a metal alloy.

    a. What are the overhead costs? (*Hint*: What is $p(0)$?)   (2 points)

    b. What are the break-even values?   (*Hint*: Where does $p(x) = 0$?)   (6 points)

    c. How many tons need to be produced and sold to maximize profit?   (3 points)

    d. What is the maximum profit?   (3 points)

5. Perform the indicated operations using radicals. Be sure to rationalize denominators where needed. Assume all variables represent positive real numbers. (3 points each)

a. $\sqrt{75n} - 3\sqrt{27n}$

b. $6\sqrt{m}\left(11 - 5\sqrt{m}\right)$

c. $\dfrac{15}{\sqrt[3]{25}}$

d. $\dfrac{-8}{1 + \sqrt{5}}$

6. a. Solve for w.   (8 points)

$$\sqrt{22w+86}-9=w$$

b. Write each of the following using radical notation.   (2 points each)

i. $x^{3/4}$ ii. $\left(\dfrac{36}{7y}\right)^{-1/5}$

7. Simplify each of the following. Express your answers in terms of positive exponents.   (6 points each)
   Assume all variables represent positive real numbers.

a. $\left(\dfrac{27r^{4/5}}{r^{-4/5}} \right)^{-2/3}$

b. $c^{-9/7}\left(5c^{23/7} - 6c^{16/7} \right)$

c. $\left(u^{3/2} + v^{2/3} \right)^2$