

NAME:

STUDENT ID:

TA:

Grading Table

Question	Possible Points	Points Earned
1	15	
2	15	
3	15	
4	10	
5	10	
6	15	
Total	80	

Please read these instructions carefully before beginning.

1. Do not open the exam until instructed to do so. You will have 50 minutes to complete the exam.
2. Final answers must be written clearly in the proper space provided. No credit will be given for illegible or ambiguous answers. Answers with no justification will not be given credit.
3. No notes, calculators, or electronic devices are permitted.

1. (15 points) Suppose that the line L_1 has equation $7x - 4y = 15$.

(a) Write down the equation of L_1 in slope-intercept form. Identify the slope and the y -intercept.

(b) Suppose L_2 is another line which is perpendicular to L_1 and goes through the point $(17, -12)$. Write down the equation for L_2 in point-slope form.

(c) Graph both lines L_1 and L_2 in the (x, y) -coordinate plane.

2. (15 points) Let $g(x) = 4\sqrt{5x - 8} + 3$

(a) Find the domain and range of g . Write your answers in interval notation.

(b) Find the inverse function $g^{-1}(x)$. You do not need to simplify this expression.

(c) Find the domain and range of $g^{-1}(x)$.

3. (15 points) For each of the following statements, choose either true or false:

(a) True or False: Every cubic (degree 3) polynomial has at least one root.

(b) True or False: Every quartic (degree 4) polynomial has at least one root.

(c) True or False: The function $f(x) = x^2$ has an inverse.

(d) True or False: A quadratic polynomial always has either 0 or 2 roots.

(e) True or False: If $f(x)$ has an inverse, then the domain of $f^{-1}(x)$ is the same as the range of $f(x)$.

4. (10 points) Let $h(x)$ be a function with domain $[2, 8]$ and range $[4, 10]$. Let $g(x)$ be the function $g(x) = 3h(3x + 5) - 7$. Find the domain and range of g . Write your answer in interval notation.

5. (10 points) Simplify the following expression. Write down your final answer using only positive exponents.

$$\left(\frac{y^{-9}(x^4t^{-7})^2}{(x^{-1}t^4)^{-2}y^{-10}} \right)^3$$

6. (15 points) Consider the polynomial $p(x) = x^3 + 5x^2 - 11x - 6$. Find all roots of $p(x)$.