First name: _____ Last name: _____ Student ID: _____

Linear Functions Homework

Basic problems

1. Complete.

1. $f(x) = 7x^3 + 13x^4 - 3x^2$ find f(-6)	2. $f(x) = -3x + 12$ find f(-1)	3. $f(x) = \dfrac{-8 - 9x}{4 + 3x}$ find f(-9)

2. Complete.

1. $f(x) = 13x^2 - 15x - 14$ $g(x) = 15x^3 + 14x^2 - 15x + 12$ find f(3) × f(10) + f(-7) × g(9)	2. $f(x) = -15x - 10$ $g(x) = 12x + 10$ find f(f(7))	3. $f(x) = -10x^2 + 10x + 14$ $g(x) = 11x + 11$ find f(17)-g(17)

3. Write each equation in standard form of ax + by + c = 0.

1. $\dfrac{-4}{9} + \dfrac{2}{9} y = x$	2. $y = \dfrac{-1}{2}$

Challenge problems

1. A line has x-intercept (5, 0) and is perpendicular to the line $2x + 8y = 10$. Find the y-intercept of the line.

2. If the point (x, y) is one-third of the way from (-2, 6) to (6,-8), then what is $x + y$?

3. Find the distance from the point (2, 3) to the line $x - y = 5$.

4. Suppose that for any integer n,
$$f(n) = \begin{cases} n-1, & \text{if } n \text{ is even;} \\ 2n, & \text{if } n \text{ is odd.} \end{cases}$$
If $k \in \mathbb{N}$, and $f(f(f(k))) = 21$, find the sum of the digits in k.

5. A line has *y*-intercept (0, 3) and is perpendicular to the line $2x + y = 3$. Find the *x*-intercept of the line.

6. How many ordered pairs of natural numbers (*n, m*) are there that solve the equation $2n + 3m = 100$?

7. Suppose that y is a linear function of x, and that y = 6 when x = 2 and y = 7 when x = 3. What is y when x = 7?

8. The line $3x + my = 3m$ cuts a triangular portion from the first quadrant whose area is 6. What is the value of m?

9. Find the distance from the point (3, 2) to the line $y = 3x + 2$.

10. If the three points (-2, -1), (x, 2), and (8, 14) are collinear, then what is the value of x?