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MATH 101
Fall 2022
HW 7: Due 10/17

Problem 1. (10pt) Do you think a person's height is a function of time? Do you think a person's salary is a function of their body temperature? For each, explain why or why not.

Solution. Though we may not know what the function is, we know that a person's height is a function of time. Given any time t, a person has one possible height—namely, their height at that exact moment. So given an input, there is only one output.

However, a person's salary is *not* a function of their body temperate. For the majority of your life, your temperature is approximately 98.6°F. However, your salary will change over time. So one year you may make $87,000 and have a normal body temperature of 98.6°F, while the next year you get a raise and make $92,000—while still having (at least some day) a normal body temperature of 98.6°F. Therefore, given the body temperature 98.6°F, there is more than one possible output salary. Therefore, a person's salary is not a function of their body temperature.

Problem 2. (10pt) Determine if the relations $f(x)$ and $g(x)$ shown below are functions. Explain why or why not. If the relation is a function, compute the functions value at $x = -4.1$.
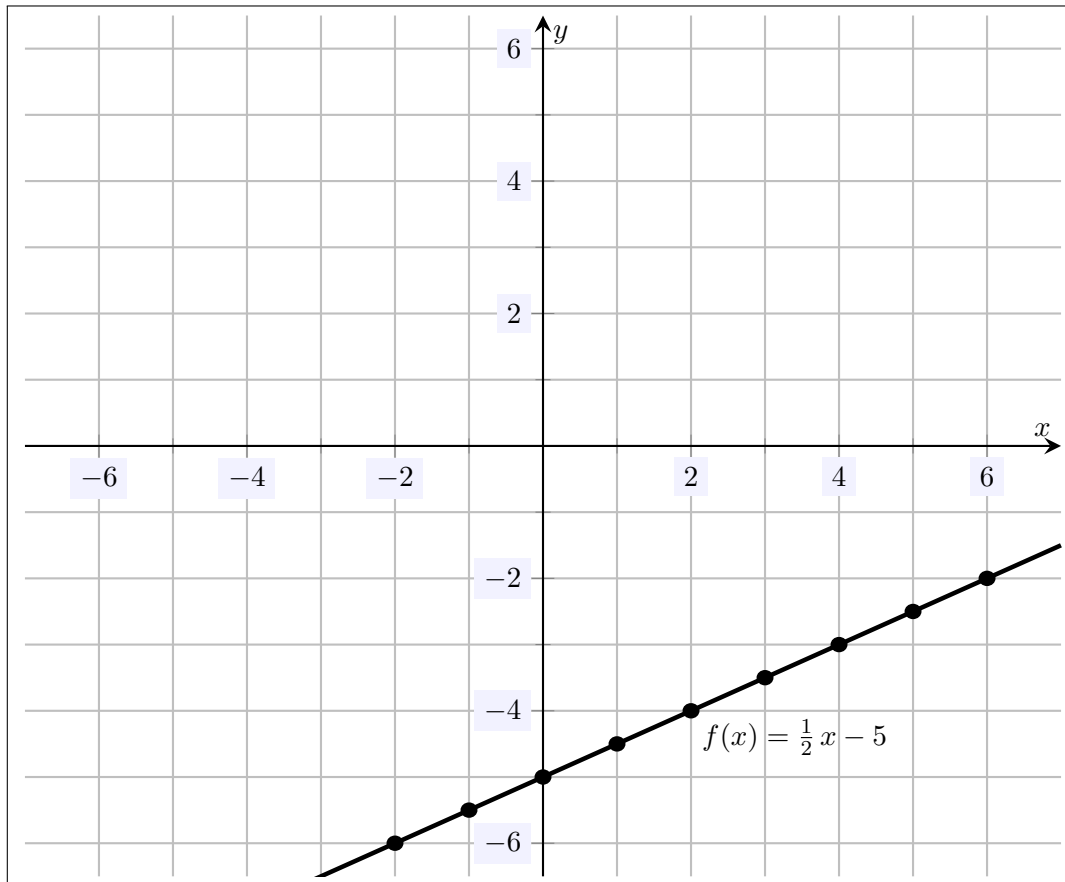
$$f(x) = 198.3 - 17.3x$$

$$g(x) = 4x^2 + 16.1x - 10.3$$

Solution. We know that both $f(x)$ and $g(x)$ are functions: given an input, x, there is only one output—namely, the one obtained by 'plugging in' x and following order of operations. We have...

$f(-4.1) = 198.3 - 17.3(-4.1) = 198.3 - (-70.93) = 198.3 + 70.93 = 269.23$

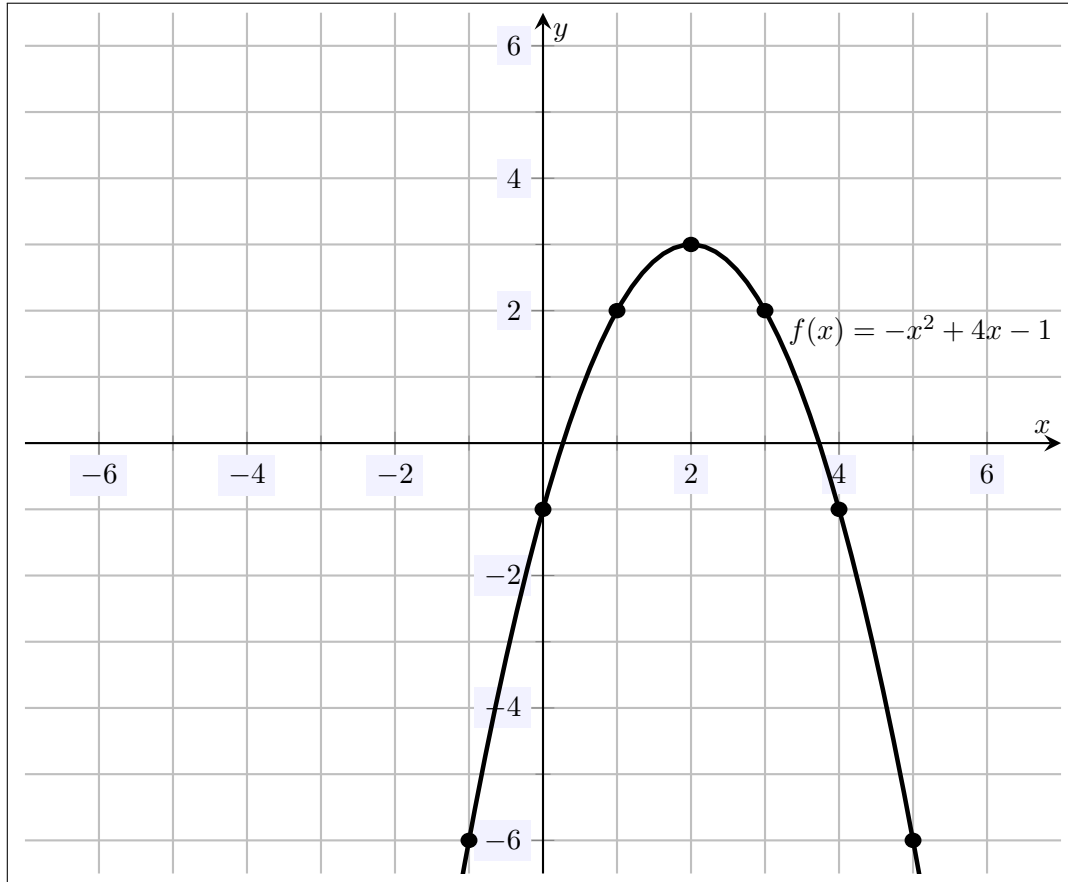$g(-4.1) = 4(-4.1)^2 + 16.1(-4.1) - 10.3 = 4(16.81) - 66.01 - 10.3 = 67.24 - 66.01 - 10.3 = -9.07$

Problem 3. (10pt) Plot the function $f(x) := \frac{1}{2}x - 5$, being as accurate as possible.

Solution. We have…

x	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7
$f(x)$	$-\frac{17}{2}$	-8	$-\frac{15}{2}$	-7	$-\frac{13}{2}$	-6	$-\frac{11}{2}$	-5	$-\frac{9}{2}$	-4	$-\frac{7}{2}$	-3	$-\frac{5}{2}$	-2	$-\frac{3}{2}$

Problem 4. (10pt) Plot the function $f(x) := -x^2 + 4x - 1$, being as accurate as possible.

Solution. We have...

x	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7
$f(x)$	-78	-61	-46	-33	-22	-13	-6	-1	2	3	2	-1	-6	-13	-22