Math113 College Algebra
First Midterm Exam
Colorado Mesa University · 2026 Spring

NAME: _____

1. What's the y-intercept of the line $4x - 3y = 7$?

2. What's the x-coordinate of the point on the line $4x - 3y = 7$ that has a y-coordinate of 43?

3. What's the x-intercept of the line parallel to $4x - 3y = 7$ that has a y-intercept of one?

4. This table reports input/output pairs for a function f. For what value(s) of x does $f(x) = 34$?

x	3	34	-2	23	44	33	15	19	4	-9	12
$f(x)$	34	7	78	32	7	4	22	5	34	-1	19

5. Does the point $(34, 56)$ lie on the graph of the function $f(x) = \frac{x^2}{77} + 41$? Also, in one or two sentences describe how you figured out the answer this question.

6. Below is the graph of a linear function f and the graph of a non-linear function g.
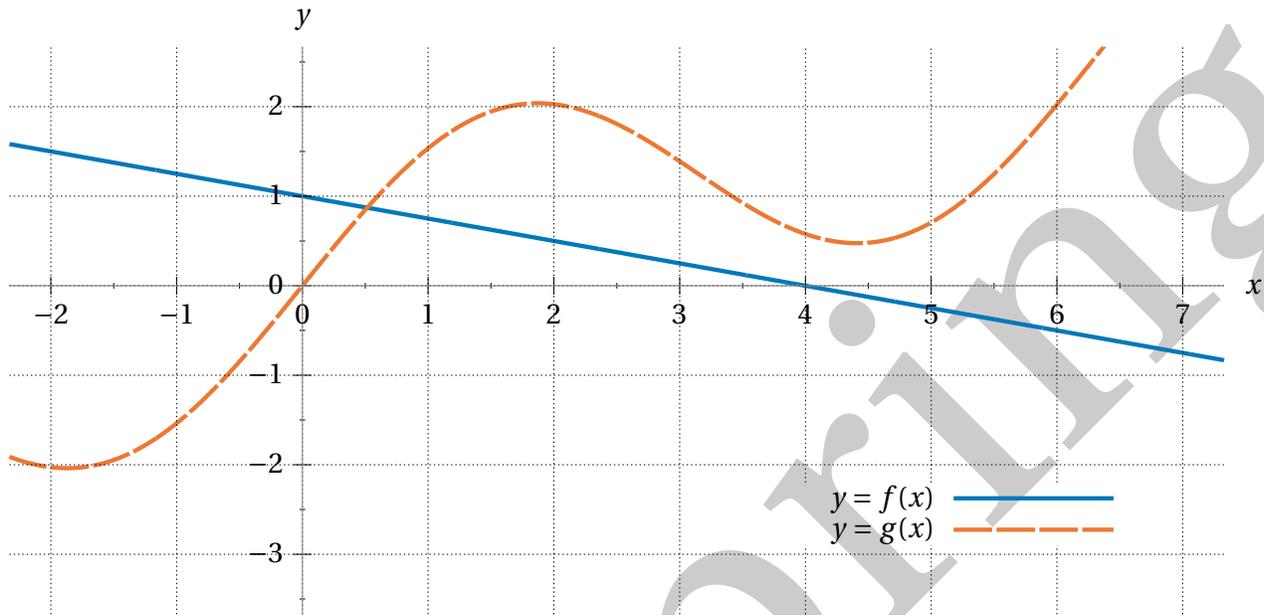
(a) Estimating, based on the plot, What is the value of $g(3)$?

(b) Estimating, based on the plot, for what value(s) of x does $g(x) = 2$?

(c) Estimating, based on the plot, for what interval(s) of x is $f(x) > g(x)$?

(d) What is a plausible formula $f(x)$ for the linear function f?

(e) On the same coordinate axes above, sketch the graph of the function $y = \frac{4}{3}x - \frac{7}{3}$.

7. The future value S of an initial investment of P dollars that will accrue *simple* interest at an annual interest rate r over the course of t years is given by the formula $S = P(1 + rt)$.

(a) Solve this formula for t in terms of the other variables.

(b) If $\$54,321$ is invested at a simple interest rate of 1.62%, how many years will it take to appreciate to a worth of $\$58,105$?

8. Looking out the front door of his bungalow, Vegeta sees a small snail crawling directly away from the door towards a pond. After retrieving a tape measure Vegeta measures that the snail is 39.6 feet from the pond, and notes that the time is 1pm. Later at 5pm, after taking a nice long nap, Vegeta remembers the snail and goes out to measure again. This time the snail is 26 feet from the pond.

Assuming the snail continues crawling at a constant speed toward the pond, write down the linear function $f(x) = mx + b$ the models the snail's distance to the pond at x o'clock in the afternoon.

9. Here is data for the population of Hawaii for select decades.

Year	2020	2010	2000	1990	1980	1970	1960	1950	1940
Population (in millions)	1.45	1.36	1.21	1.11	0.96	0.77	0.63	0.50	0.42

From https://worldpopulationreview.com/states/hawaii.

(a) Using technology, perform linear regression to determine a function of the form $f(x) = mx + b$ that models the population of Hawaii. Write the formula for your model here.

(b) What is the value of the parameter m in your model, and what is its significance in regards the population of Hawaii?

(c) (EXTRAPOLATE) Assuming the linear model remains accurate beyond the domain of the data, what does it predict the current population of Hawaii to be?

(d) (EXTRAPOLATE) Assuming the linear model remains accurate beyond the domain of the data, what month of what year will the population of Hawaii first exceed two million people? Demonstrate how to manually calculate this from the formula for the linear model.

(e) Do you think a linear function is a reasonable choice of model to accurately describe this situation? Write down your thoughts, list pros and cons, etc.