

College of the Redwoods
Mathematics Department

Math 120 — Intermediate Algebra
Exam #2

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Quiz Questions

Read Carefully! You have until Monday (10/8/07) to complete the quiz. The quiz is due at the beginning of class on Monday (10/8/07). Late quizzes are not accepted.

This quiz is open notes, open book. This includes any supplementary texts or online documents. You must answer all of the exercises on your own. You are not allowed to work in groups or pairs on the quiz. You are not allowed to enlist the aid of a tutor or friend to help with the quiz. You are not allowed to read the exercises in the quiz, then seek help on similar questions. Once you open the quiz and read the questions, you may not seek any outside help of any kind.

I am not interested in reading pages and pages of calculations without accompanying narrative. It is essential that you include sound mathematical writing that both explains and justifies your solution or proof. Grammar and punctuation are important, as is the organization of your solution on the written page.

When working in the Mathlab, please do not work next to any other student who is also working on the quiz. For the sake of propriety, please separate yourselves when working on the quiz in the Mathlab.

Place the solution to each exercise on a separate sheet of paper. On a good sheet of paper, write out (longhand) and sign the following honor pledge.

I promise that all work found herein is my own. I have received no help from tutors, colleagues, or other teachers. I also promise that I have refrained from sharing my work and ideas with other students in the class. I have also honored all of the quiz constraints listed in the directions.

Arrange your solutions in order, place these quiz page(s) on top of your solutions, then place the honor pledge on top of the quiz as a cover sheet. Staple. Good luck!

EXERCISE 1. In this exercise, you are to find the equation of the line that crosses the y -axis at $(0, 4)$ and is *parallel* to the line $3x + 4y = 12$. Follow directions in each of the following parts exactly.

- Set up a coordinate system on a sheet of graph paper. Label and scale each axis.
- Solve $3x + 4y = 12$ for y , placing the standard form $3x + 4y = 12$ into slope-intercept form. Use the slope-intercept form to draw the line in blue. Label this line with its equation.
- In red, draw the line through $(0, 4)$ that is *parallel* to the line $3x + 4y = 12$. In grading this part, I will count boxes to make sure that your line has the correct slope. Label this line with its equation.

EXERCISE 2. In this exercise, you are to find the equation of the line that passes through the point $(5, -3)$ and is *perpendicular* to the line $5x - 3y = -15$. Follow directions in each of the following parts exactly.

- Set up a coordinate system on a sheet of graph paper. Label and scale each axis.
- Determine the x - and y -intercepts of the line $5x - 3y = -15$. Plot each of these intercepts on your coordinate system and label each with its coordinates. In blue, draw the line $5x - 3y = -15$ through these intercepts and label this line with its equation.
- In red, draw the line through $(5, -3)$ that is *perpendicular* to the line $5x - 3y = -15$. In grading this part, I will count boxes to make sure that your line has the correct slope.
- Use the point-slope form to determine the equation of the line through the point $(5, -3)$ that is *perpendicular* to the line $5x - 3y = -15$. Place your answer in *standard form* $Ax + By = C$,

where A , B , and C are integers and $A \geq 0$. Label the appropriate line in your sketch with this result.

EXERCISE 3. A ball is thrown upward with initial velocity 300 feet per second (ft/s). It immediately begins to lose velocity at a constant rate of 32 feet per second per second (ft/s/s). In the items that follow, your job is to determine a model for the velocity v as a function of time t .

- Set up a coordinate system on graph paper. Label and scale each axis. Place v , the velocity of the ball, on the vertical axis. Place t , the time, on the horizontal axis. Be sure to include units with your axes labels. Sketch the line that models the problem constraints. You must be accurate. I will be checking your vertical intercept and I will count boxes, using the scale you indicate, to determine if you've given your line the correct slope.
- Determine the equation of the line in the form $y = mx + b$, then replace y with v and x with t , respectively. Finally, use function notation to write the velocity as a function of t .
- Use the function determined in part (c) to find the speed of the ball after 8 seconds. Include units with your answer.
- Use the function determined in part (c) to find the time it takes the ball to reach its maximum height. Include units with your answer.

EXERCISE 4. David and Liz are hanging masses from a spring in the physics lab. They record the distance each mass stretches the spring in a table.

$x(\text{cm})$	10	20	30	40	50	60
$m(\text{grams})$	1.5118	2.8735	4.0994	6.1436	6.7144	7.8016

- Set up a coordinate system on a sheet of graph paper. Label and scale each axis. Place x , the distance stretched on the vertical axis. Place m , the mass, on the horizontal axis. Be sure to include the units with your labels. Plot the data points from the table on your coordinate system, then use a clear plastic ruler to draw the "line of best fit."
- Pick two points on your line of best fit that are not data points. Use a different marker style to differentiate these points from the original data points (maybe a 'cross' instead of a 'dot'). Use your graph to estimate the coordinates of these points. Label each point with its estimated coordinates.
- Use the two estimated points from part (c) to determine the slope of the line of best fit. Include units with your answer. Write a sentence that explains the real-world meaning of the slope in this example. Be sure to include the units in your sentence.
- Use the point-slope form $y - y_0 = m(x - x_0)$ of the line to determine the equation of the line of best fit. Replace y with x and x with m and solve for x in terms of m . Label the line of best fit with the resulting equation.
- Load the data into your calculator and use the linear regression routine in your calculator to determine the equation of the line of best fit. Label your line of best fit with this second equation.