Try taking these practice exams under testing conditions: no book, no notes, no classmate's help, no electronics (computer, cell phone, television). Give yourself one hour to work and wait until you have tried your best on all of the problems before checking any answers.

Practice exam 4– version a

Relax. You have done problems like these before. Even if these problems look a bit different, just do what you can. If you're not sure of something, please ask! You may use your calculator. Please show all of your work and write down as many steps as you can. Don't spend too much time on any one problem. Do well. And remember, ask me if you're not sure about something.

A few formulas from our book:

FORMULAS PRINTED ON EXAM GO HERE

---

1. (4.1) Forrest's candy bucket weighs 4 ounces when empty. Each Snickers Almond bar he puts in his bucket weighs 1.76 ounces. (For those who can remember, Snickers Almond is essentially the old Mars Bar renamed. But, I digress.) The total weight T ounces of Forrest's candy bucket depends on the number of Snickers Almond bars B in it according to the equation

$$T = 4 + 1.76B$$

   (a) Make a table of values showing the weight of the bucket if it contains 1, 5, 12, or 20 candy bars.

   (b) Draw a graph illustrating the dependence.

   (c) If Forrest's candy bucket can hold up to 3 pounds (that's 48 ounces), approximately how many candy bars can it hold? *Say what the answer is and mark the point on your graph that shows the answer.*

   (d) Solve the inequality $4 + 1.76B \leq 48$. Interpret!

2. (4.1) Kathy is a single mom trying to raise her kids on the salary from her part-time job. She gets help from the state. Each month they give her $300 credit on her EFT card that she can use to buy groceries. Every day after work Kathy stops at the corner store and buys $10 worth of food, which is deducted from her EFT card.

   (a) How much does Kathy have left on her card at the end of the month (30 days)?

   (b) Name the variables and write an equation relating them.

   (c) Identify the slope and intercept. Don't forget the units.

   (d) Calculate a few more values and use them to draw a graph of Kathy's EFT balance for up to 30 days. Don't forget to include day 0.

   (e) How would the equation be different if she began with $400 in credit and spent $12 each day?

(f) Draw that line on your graph too.

3. (4.2) The Vang family want to buy a new washing machine. The first model costs $645 and then $13.29 per month to run or another, more efficient, model costs $940 and then $7.82 per month to run. If M is the number of months and V is the Vang family's total cost (in $), then the equations and some comparable values (to the nearest $) are:

SU REFORMAT TABLE!

First model: $V = 645 + 13.29M$
Second model: $V = 940 + 7.82M$

W	12	36	60
First model:	804.48	1,123.44	1,442.40
Second model:	1,033.84	1,221.52	1,409.20

(a) Draw a graph illustrating both equations. *Be sure to include the intercepts.*

(b) What's the **payback time** (the number of months for which the total costs of each washing machine are equal)?

4. (4.2) BUT MAYBE NOT USE? Nils and Frida want to rent a limo for the prom. A Cadillac rents for $50 plus $6 / hour. A Lincoln rents for $25 plus $12 / hour.

(a) If he wants the limo for 3 hours, how much will it cost for the Cadillac? for the Lincoln?

(b) If he wants the limo for 8 hours, how much will it cost for the Cadillac? for the Lincoln?

(c) At how many hours do the two different types of limo cost the same? Use succesive approximation to find the answer. Display your work in a table.

(d) Now answer the question by solving an equation.

(e) Solve an inequality to find the range of times for which the Cadillac costs no more than $75 to rent.

(f) Solve an inequality to find the range of times for which the Cadillac costs less than the Lincoln to rent.

5. (4.2) Will women every run the marathon as fast as men do? The world records are getting close. In 2012 the men's record was 2:03:38 and the women's record was 2:15:25. (Each time is given in H:M:S, or hours:minutes:seconds, format.) That's only about 12 minutes apart! On the other hand, the record is changing very slowly. Estimates for the men's time shows about 13 second drop per year on average. For women's that's fast, but still only 26 seconds drop per year on average.

Source: Wikipedia (Marathon World Record Progression)

(a) Convert the current record time for men and for women into seconds.

(b) Write an equation for each function. Don't forget to name the variables.

(c) Set up and solve a system to estimate when the women's record might equal the men's record.

(d) Draw a quick graph to check.

6. (4.3) Arjun just graduated from college but is living with his uncle for the summer to save money. They agreed that Arjun would do chores and some light renovations instead of paying rent. Arjun has been doing around 5 hours of work a week for the past 8 weeks, but still owes his uncle another 30 hours of work.

   (a) What was the original agreement? That means, how many hours of work did Arjun promise his uncle?

   (b) Name the variables and write an equation relating them, assuming Arjun does 5 hours a week of work.

   (c) How many more weeks will it take Arjun to finish the work he promised?

7. (4.3) An online music club charges a monthly enrollment fee plus $.95 per album you download. Last month Andrew downloaded 31 albums for a total cost of $49.00.

   (a) What is the monthly enrollment fee?

   (b) Name the variables, including units, and write an equation relating them.

   (c) How much (total) will it cost in a month where Andrew downloads 20 albums?

   (d) If the bill next month is for $87.95, how many albums did Andrew download? Show how to solve the equation.

   (e) If it takes Andrew approximately 43 minutes to listen to each album, how long will it take him to listen to those albums he downloads next month (your answer to (d))? Round your answer to the nearest hour.

8. (4.4) A report shows September sea-ice declining in the Northern hemisphere. In 1980 the extent of the sea-ice was 3.1 million square miles. By 2012, the sea-ice extended only 1.7 million square miles. For this problem, suppose that the area of sea-ice decreases linearly.
   Source: National Snow and Ice Data Center

   (a) Name the variables, including units.

   (b) Display the information from the story in a table.

   (c) What is the rate of sea ice decrease?

   (d) Write a linear equation relating your variables.

   (e) Scientists are concerned that if the September sea-ice falls between 200,000 and 500,000 square miles, then other climate feedbacks will lead to no more sea-ice in September. According to your equation, in what years is this expected to occur? Set up and solve an inequality to answer the question.

   (f) Graph and check.

9. (4.4) The local zoning commission is considering a plan to expand housing in the city, as measured in the number of residential units. But with more residential units come more shops, offices, schools, recreational facilities, churches, and other commercial property. Currently the city has 3,500 residential units and 1,575 acres of commercial property. If the propsal is passed in completed, the city will have a new total of 3,600 residential units and 1,620 acres of commercial property. You can assume this increase is linear.

(a) Name the variables and summarize the given information in a table.

(b) Approximately ow many new acres of commercial property are there for each new residential unit built?

(c) Write an equation relating the variables.

(d) If the city decides to limit the amount of land to 1,600 acres of commercial property, approximately how many residential units can there be? Use successive approximation.

(e) Now answer the question by setting up and solving an equation.

10. (4.5) As people age, they begin to experience hearing loss. A study was done to determine the "comfort level" of sound for people of different ages, meaning the loudest sound (in decibels) that the person could listen to comfortably. The data are given in the table below.

Name	Akbar	Javier	Walter	Xang	Rolf	Derrick	Iago	Raheem
Age	45	45	55	65	75	75	85	85
Comfort level	58	61	63	71	75	80	82	79

(a) Make a scatterplot showing the data. *Scale your axes to start at 40 years and start the level at 56 decibels.*
Spread out your scale to get a large, detailed graph.

(b) Draw the line through the points listed for Xang and Rolf. Explain why that line does not fit the data well. *Label this line B.*

(c) SU TELL THEM BEST FIT LINE AND HAVE THEM DRAW IN.

11. (4.5) It's been a long time since anyone broke the record for the men's long jump. In 1935 Jesse Owens jumped 8.13m. The record was next broken 25 years later (in 1960) by Ralph Boston who jumped 8.21m. He broke his own record several times over the next few years, including being surpassed briefly by Igor Ter-Ovanesyan. Ralph's final record was 8.35m in 1965. Not to be outdone, Igor tied the record in 1967. Then in 1968, Bob Beamon jumped 8.90m. That record held for 23 years, until Mike Powell jumped 8.95m in 1991 (much to Carl Lewis' dismay). Powell's record still stood 21 years later, in 2012.   Source: Wikipedia (Long Jump)

(a) SU GIVE THEM SCATTER PLOT

(b) Draw in the line connecting the data from 1935 and 2012. Use it to predict the long jump record in 2020.

(c) Draw in the line connecting the data from 1991 and 2012. Use it to predict the long jump record in 2020.

(d) Which of your lines do you prefer, and why? SU CHECK IF EITHER IS GOOD.

SU – edit and split later