

Math 1311 Test 1 Review

Test instructions

Where: CASA Testing Center (~~222 Garrison Gym~~)

Time: 50 minutes

What is covered? Prerequisites and Chapter 1

Number of questions: 15

13 Multiple Choice Questions 6 points each (total of 78 points)

2 Free Response Questions 10 and 12 points (total of 22 points)

For the free response part, please **show your work neatly. Do not skip steps.**

Bring your calculator with you to CASA. If you forget your calculator, you will have to take the test without. There are NO spares. Bring extra batteries too.

Do not forget to go to CASA for fingerprint/picture process before your test date!

Remember the make-up policy: NO MAKE UPS!

1. Write using scientific notation:

a. $125,000.$

$$1.25 \times 10^5$$

b. 0.000028

$$2.8 \times 10^{-5}$$

2. Write as a decimal number:

a. 3.1×10^5

$$310,000$$

b. 9.167×10^{-8}

$$.00000009167$$

3.

a. Round $76.\underline{2}46$ to the nearest **tenth**.

$$76.2$$

b. Round $34.\underline{6}94$ to the nearest hundredths.

$$34.\underline{69}5$$

$$34.69$$

$$34.7$$

4.

a. $3(1 + 2\sqrt{x})$

$$3 + 6\sqrt{x}$$

b. $3\sqrt{5} - \sqrt{5}$

$$= 2\sqrt{5}$$

$$\sqrt{5}(3-1)$$

$$5. \left(\frac{9 \cdot 6 - 6^2}{7 + 3 \div 9} \right) = \frac{54 - 36}{7 + \frac{3}{9}} = \frac{18}{3 \cdot \frac{7}{3} + \frac{1}{3}} = \frac{18}{\frac{21}{3} + \frac{1}{3}} = \frac{18}{\frac{22}{3}} = 18 \cdot \frac{3}{22} = \frac{27}{11}$$

6. A breeding group of foxes is introduced into a protected area, and the population growth follows a logistic pattern. After t years the population of foxes is given by the following formula:

$$N = \frac{37.5}{(0.25 + 0.76^t)}$$

- How many foxes were introduced into the protected area?
- What is the average rate of change in the fox population between the 4th and the 9th years?

$$(a) \quad t=0 \quad N(0) = \frac{37.5}{0.25 + 0.76^0} = \frac{37.5}{0.25 + 1}$$

$$(b) \quad \text{AROC} = \frac{N(9) - N(4)}{9 - 4} = \frac{112.08 - 64.254}{5}$$

$$N(4) = 64.254$$

$$N(9) = 112.08$$

= 10 foxes per year.

7. You pay your secretary \$9.25 per hour. A stamped envelope costs 50 cents, and a paper costs 3 cents per page.
- How much does it cost to prepare and mail a 3-page letter if your secretary spends 2 hours on typing and corrections?
 - Use a formula to express the cost of preparing and mailing a letter as a function of the number of pages in the letter and the time it takes your secretary to type it.
 - Use the function you made in part b to find the cost of preparing and mailing a 2-page letter that takes your secretary 25 minutes to type.

$$(a) \quad C = .5 + 3(.03) + 9.25(2) = \$19.09$$

$$(b) \quad n = \# \text{ of pages} \quad t = \# \text{ hours}$$

$$C = .5 + n(.03) + 9.25t = .5 + .03n + 9.25t$$

$$(c) \quad C = .5 + .03(2) + 9.25\left(\frac{25}{60}\right) = \$4.41$$

8. The following table gives values for a function $N = N(t)$. Calculate the average rate of change from $t = 10$ to $t = 20$. Use your answers to estimate the value of $N(11), N(14)$.

t	10	20	30	40	50	60	70
$N = N(t)$	16.7	22.6	44.4	51.5	52.6	53.4	53.5

$$AROC = \frac{N(20) - N(10)}{20 - 10} = \frac{22.6 - 16.7}{10} = .59$$

$$N(11) = N(10) + 1 \text{ unit of change} = N(10) + AROC$$

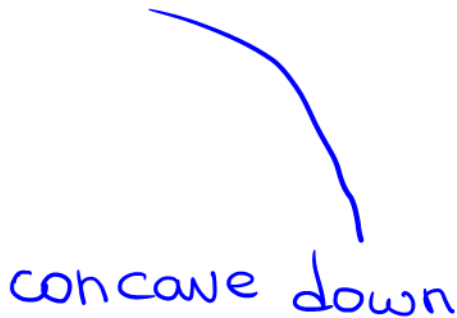
$$N(14) = N(10) + 4 \text{ units of change} = N(10) + 4 AROC$$

$$N(11) = 16.7 + .59 = 17.29$$

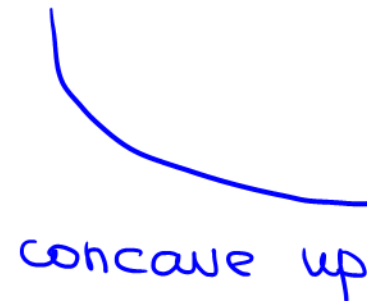
$$N(14) = 16.7 + 4(.59) = 19.06$$

9. Sketch

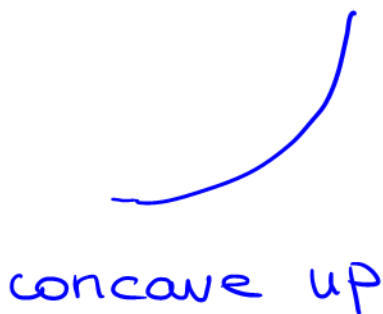
a. A function is decreasing at an increasing rate.



b. A function is decreasing at a decreasing rate.



c. A function is increasing but at an increasing rate.



d. A function is ~~decreasing~~^{increasing} at a decreasing rate.



10. Charles needs a cable that is 11 inches long. If the cable costs \$ 1.80 per centimeter, approximately how much would he pay for the entire cable? Show how to set up the calculation to solve this problem. Note that 1 inch = 2.54 c.m.

$$C = (11)(2.54)(1.80) = \$50.29$$

11. Suppose you want to buy a pair of shoes that cost \$ x. The shoes are currently on sale for 30% off. When you purchase the shoes, you will have to pay 9% sales tax. Show how to set up the calculation to determine the total you must pay for the shoes.

$$x(.7) + x(.7)(.09)$$

12. City water, which is slightly chlorinated, is being used to flush a tank of heavily chlorinated water. The concentration $C = C(t)$ of chlorine in the tank t hours after flushing begins is given by $C(t) = 0.1 + 2.76e^{-0.32t}$ milligrams per gallon. What is the **initial** concentration of the chlorine tank?

$$t=0$$

$$C(0) = 0.1 + 2.7 \cancel{e^{-0.32(0)}}^1$$

$$= 2.8 \text{ milligrams per gallon}$$

13. Suppose that you are getting married and planning your wedding. It costs \$3600 to rent the banquet hall and it includes a catered lunch for 50 guests. For each additional guest the catered lunch costs \$35. Find a formula showing the cost of the wedding venue and lunch if n guests are invited. Assume that n is at least 50.

$$C(n) = 3600 + 35(n - 50)$$

14. Function $P(M, r, t) = M \times \frac{1}{r} \times \left(1 - \frac{1}{(1+r)^t}\right)$ shows the amount of money P , in dollars, that you can afford to borrow at a monthly interest rate of r (as a decimal) if you are able to make t monthly payments of M dollars. How much money can you afford to borrow at the monthly interest rate of 0.9% if you can afford to pay \$300 per month for 2 years?

$$0.9\% \rightarrow .009 \quad 2 \text{ years} \rightarrow 24 \text{ months}$$

$$P(300, 0.009, 24)$$

$$= 300 \left(\frac{1}{0.009} \right) \left(1 - \frac{1}{(1+0.009)^{24}} \right)$$

$$= \$6449.53$$