

Exam 2 Study Guide

Extra review session: Wed., Oct. 17, 4:00 - 5:30 pm, MLSC (5th floor of library)

**Exam: Th., Oct. 18, 5:30 - 6:30 pm**

1. You're managing a snow cone stand for the summer. Over the past two summers, you kept some data and found that when a medium snow cone is \$1.50, you sold 90 snow cones per day. When a medium sno cone cost \$1.75, you sold 80 snow cones per day.
  - a. Assume the relationship between price of sno cone and number of sno cones sold is linear. Find an equation for  $C(p)$ , the number of sno cones sold as a function of the price.

b. The equation for your revenue is  $R(p) = p(150-40p)$ . How much should you charge per sno cone to maximize revenue? Round to two decimal places.

c. What price(s) per sno cone will result in your revenue being at least \$100 per day? Round to two decimal places. Round to two decimal places.

d. For what price(s) does revenue equal \$0 per day? Round to two decimal places.

e. For what price(s) does revenue equal \$75 per day? Round to two decimal places.

f. What is the minimum revenue you will make if a sno cone costs at least \$1 but no more than \$2?

g. What is the maximum revenue you will make if a sno cone costs at least \$2 but no more than \$3?

2. Suppose a candle is burning at a constant rate of 1.3 inches per hour. Let  $g(t)$  represent the length of the candle (in inches) and let  $t$  represent the number of hours elapsed since the candle was lit.

a. Explain what the expression  $g(2) - g(1)$  represents in the context of the situation.

b. Evaluate  $g(2) - g(1)$ . [Another way of asking this: what does  $g(2) - g(1)$  equal?]

c. Explain what the expression  $g(2.7) - g(1.3)$  represents in the context of the situation.

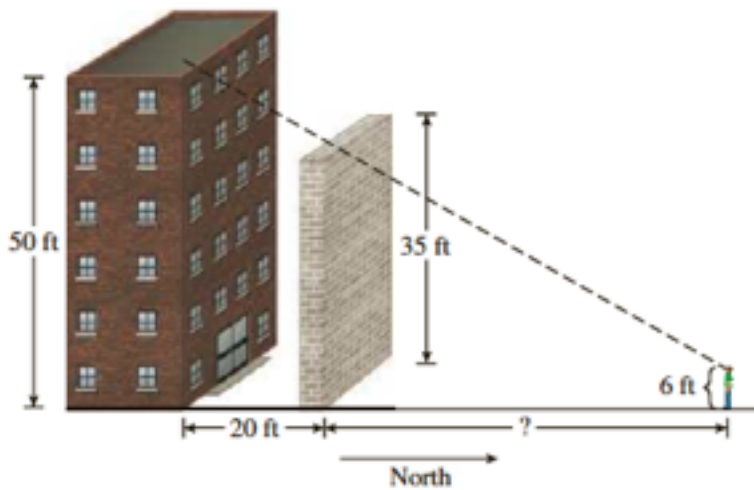
d. Evaluate  $g(2.7) - g(1.3)$ .

e. Suppose the candle was 3.1 inches long after having burned for 2.9 hours. How tall was the candle before it was lit?

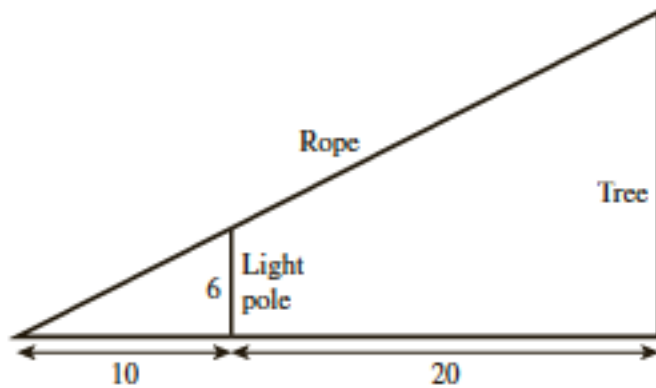
2. Mara is traveling down Interstate 35 at a constant velocity. For every increase of ten minutes since she passed mile marker 174, her distance from Downtown Oklahoma City decreases by 7 miles. Let  $y$  represent her distance from OKC and let  $x$  represent time in minutes. Which of the following statements are true? If the statement is false, fix it to make it true.

- a. From now to ten minutes from now, her distance to OKC will have decreased by 7 miles.
- b. From now to twenty minutes from now, her distance to OKC will have decreased by 14 miles.
- c. From now to 15 minutes from now, her distance to OKC will have decreased by 11 miles.
- d.  $\Delta y = -0.7\Delta x$
- e.  $\Delta y = -7\Delta x$
- f.  $\Delta y = 0.7\Delta x$
- g.  $\Delta y = 7\Delta x$

4. How far from the middle wall must the man in the picture stand so that he can see the top of the building to the far left?



5. Forrest needs to cut down a tree. A rope is attached to the top of the tree to determine the direction in which the tree will fall. The rope meets the top of a 6-foot-tall light pole that is 20 feet away from the tree (see figure below). There is a concern that when the tree falls, it will damage the light pole.



a. How tall is the tree?

b. Will the tree hit the light pole when it falls?

6. You're playing Monopoly with some friends. You buy Boardwalk for \$400. Each time one of the other players lands on your property, they pay you \$50 rent.

a. Write an equation for your profit,  $P$ , as a function of  $n$ , the number of other players who land on Boardwalk.

b. How many other players must land on Boardwalk for you to break even?

8. One evening, 1500 concert tickets were sold for a country music festival. Tickets were \$25 for covered pavilion seats and \$15 for lawn seats. The organizers collected \$28,500 from ticket sales. How many of each type of tickets were sold?

9. Of the four data sets below, one is exactly linear, one is approximately linear, one is exactly exponential, and one is approximately exponential. For each data set, (i) identify which type of model suits it, **justifying your reasoning with appropriate computations**, and (ii) find an appropriate model.

Table A

x	0	1	2	3	4
y	27	35	43	51	59

Table B

x	0	1	2	3	4
y	222	73	25	9	3

Table C

x	0	1	2	3	4
y	138	115	94	70	50

Table D

x	0	1	2	3	4
y	4	12	36	108	324

10. A violin string is stopped so that the resulting string length makes a desired musical note. In order to make the next highest note, the string must be shortened by a factor of 0.944. That is, the current length is multiplied by 0.944. The length of an unstopped string is 32 cm. One of the unstopped strings makes an A note. To what length must the string be stopped to make a C#, which is four notes higher?

11. A recent report states that the gray wolf population that ranges through Idaho, Montana, Wyoming, Oregon, and Washington declined by 5% from 2009 to 2010. Suppose the wolf population continues to decline at a rate of 5% per year. In 2009, there were 1071 wolves. Write an exponential function that gives the wolf population  $W$  after  $t$  years.

12. You get a new credit card and make an initial charge but then charge nothing else. The table shows your balance  $B$ , in dollars, after you have made  $n$  monthly payments.

<b><math>n</math> = number of payments</b>	1	2	3	4
<b><math>B</math> = balance</b>	485.00	470.45	456.34	442.65

a) Show that the data in the table is exponential. (Round to 2 decimal places.)

b) What is the percentage decay per payment?

c) What was the initial charge?

c) Write an exponential formula for  $B$  as a function of  $n$ .