

Quiz #4
Mathematics 140—Applied Calculus
Dr. Peratt
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Directions: Carefully answer the questions below. Remember that your goal is to convince me that you know what is going on, so show your work! When relevant, round your final answers to 3 decimal places.

1. **Modeling:** The intensity, I , of light at a given location is inversely proportional to the square of the distance, d , from that location to the light source.

- (a) Write the form of the mathematical model for this situation.
- (b) List the factors which cannot affect the value of the proportionality constant if the model is to remain valid.

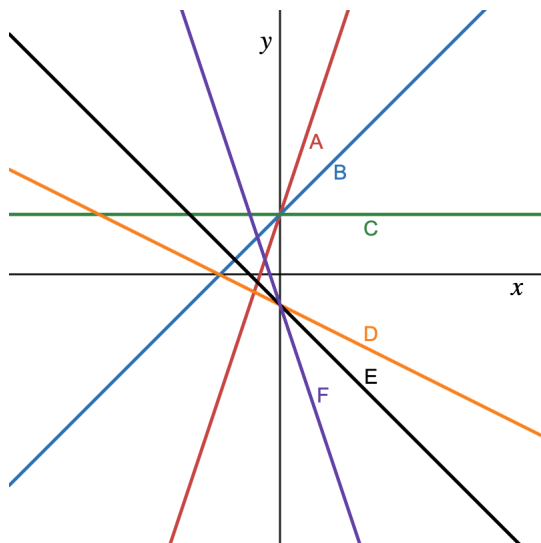
- (c) List *two factors* which do affect the value of the proportionality constant.

- (d) The intensity of a light for various distances is shown in the table below. Do they indicate the model is valid and, if so, determine the proportionality constant.

d in m	0.1	0.5	0.75	2.0
I in $\frac{W}{m^2}$	476.03	19.11	8.46	1.19

2. **Linear Equations:** If $s(2.3) = 5.7$ and $s(4.8) = 1.2$, then write a linear equation of s as a function of q .

3. **Graphs of Linear Functions:** Match the following linear equations with the lines shown in the figure below:
 (1) $y = -x - 1$, (2) $y = 3x + 2$, (3) $y = -3x - 1$, (4) $y = 2 + x$, (5) $y = -\frac{1}{2}x - 1$, (6) $y = 2$.



(1): _____

(2): _____

(3): _____

(4): _____

(5): _____

(6): _____

Extra Credit: A car rental company charges a daily fee of \$35 plus \$0.20 per mile driven. Find a formula for the daily charge, C , in dollars, as a function of the number of miles, m , driven that day.