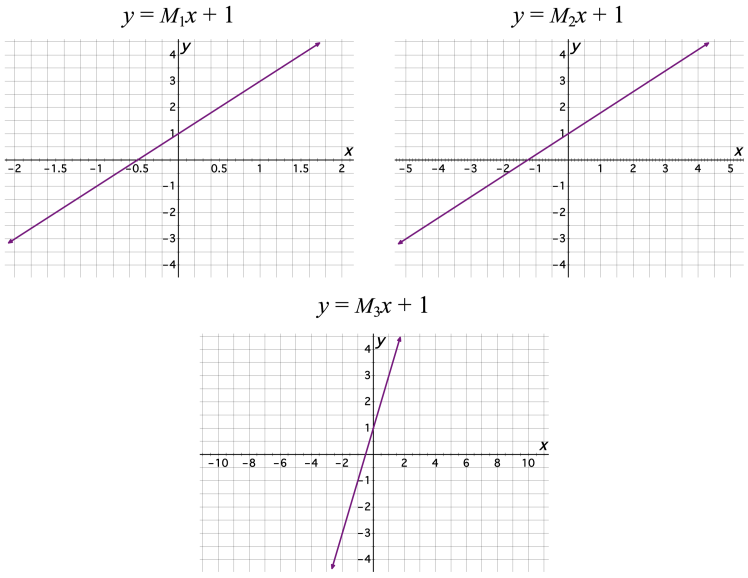
Graphing Constant Rate of Change

1. The graphs of three linear functions with respective slopes of M_1, M_2, and M_3 are shown below. Order the slopes from smallest to largest.



a. $M_1 = M_2 < M_3$

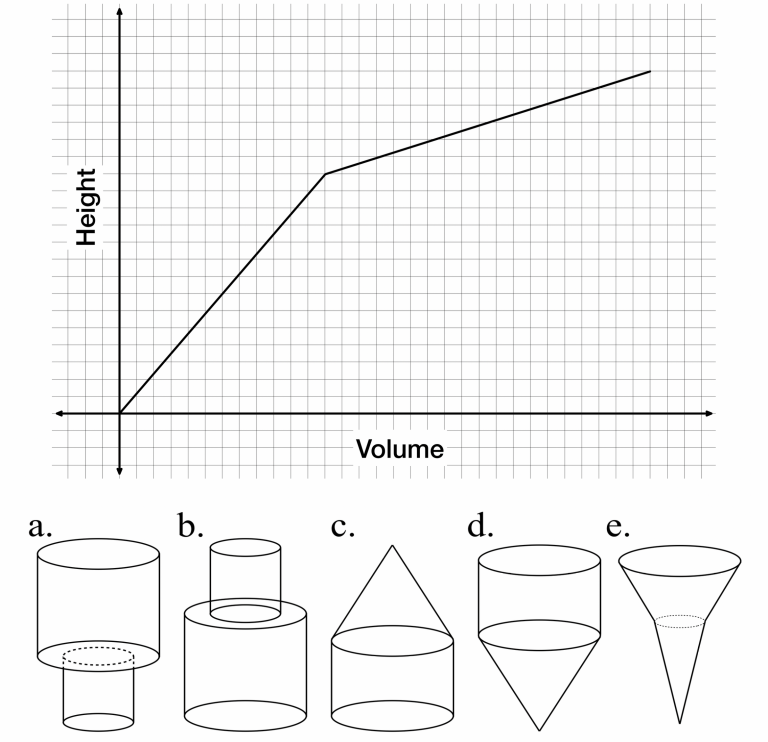
b. $M_2 < M_1 = M_3$

c. $M_1 < M_2 < M_3$

d. $M_3 < M_2 < M_1$

e. $M_1 < M_3 < M_2$

2. The graph below represents the height of water as a function of volume as water is poured into a container. Which container is represented by this graph?



3. A candle has been burning at a constant rate of 1.25 inches per hour. The candle has been burning for 4 hours and is 5.5 inches tall. Graph the time that the candle has been burning as a function of the candle's length.

4. Jenna is riding her roller blades home from campus at a constant speed of .23km/min. At 10:12, Jenna is 2.5km away from campus.

   (a) How far is Jenna from campus at 10:13?

   (b) How far is Jenna from campus 3.7 minutes past 10:12?

   (c) When did Jenna leave campus?

   (d) Graph Jenna's distance from campus as a function of time with $t = 0$ being 10:12.

5. Box 1 is pushed horizontally 8 feet (ft) with a constant force of 10 Newtons (N), and then a second box is placed on top of Box 1. Boxes 1 and 2 are pushed horizontally $6ft$ with a constant force of $12N$, and then a third box is placed on top of Box 2. All three boxes are pushed horizontally $10ft$ with a constant force of $15N$. The energy required to exert a constant force F across a distance D is $E = F \cdot D$.

   (a) How much energy is required to push Box 1 a distance of $5ft$?

   (b) How much energy is required to carry out the entire activity described?

   (c) Graph the energy required to carry out this entire activity as a function of total distance that Box 1 is pushed. Note that Box 1 being pushed $10ft$ means that Box 1 was pushed $8ft$ and then Boxes 1 and 2 were pushed $2ft$, etc.