Practice Work Sample Problems

$y = mx + b$

A.CED.1, F.BF.1a, F.LE.5, or S.ID.7

1. A caterer charges \$120 to cater a party for 15 people and \$200 for 25 people. Assuming that the cost is a linear function of the number of people. Write an equation to represent the cost a party based on the number of people, explain what the slope and y-intercepts represents in the context of the problem, and then determine how much a party for 40 people would cost.

Find an equation for the cost of a party and explain what the slope & y-intercepts mean then find the cost for a party for 40 people.

$(15, 120)$ $(25, 200)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{200 - 120}{25 - 15} = \frac{80}{10} = 8$$

Slope = 8

This means the company charges \$8.00 per person

$y - y_1 = m(x - x_1)$

$y - 120 = 8(x - 15)$

$y - 120 = 8x - 120$

$+120 \quad +120$

$y = 8x$

y-intercept = 0

This means the company does not have a flat fee that they charge

Find y when $x = 40$

$y = 8(40)$ $y = \$320$

A party for 40 people would cost \$320.00

* this problem is a bit more difficult than the work sample will be.

* 2. The water level of a river was 34 feet on June 1st. One June 30th the water level was 19 feet. Write an equation to represent the water level, explain what the slope and y-intercepts represent in the context of the problem, and then determine how many days it will take for the water level to be at its minimum of 15 feet.

Find an equation to represent water level and explain the slope and y-intercept, then find the number of days required for the river level to be a minimum of 15ft.

$(1, 34)$ $(30, 19)$

$$m = \frac{19-34}{30-1} = \frac{-15}{29} = -0.517241379\overline{3}$$

$m \approx -0.52$

This means the river level is dropping by about 0.52 feet per day

$$y - y_1 = m(x - x_1)$$

$$y - 34 = -0.52(x - 34)$$

$$y - 34 = -0.52x + 17.68$$

$+34$ $+34$

$$y = -0.52x + 51.68$$

y-intercept = 51.68

This means the river started with about 51.68 feet of water

Find x when $y = 15$

$$15 = -0.52x + 51.68$$

-51.68 -51.68

$$-36.68 = -0.52x$$

$$\frac{-36.68}{-0.52} = \frac{-0.52x}{-0.52}$$

$$70.53846154 = x$$

$x \approx 70.5$ day

It will take about 70.5 days for the water level to be 15ft

3. A bus company took a tour bus on the ferry when there were 30 people aboard. The ferry charged the bus company $180. The following week, the bus had 50 people on board and the ferry charged them $220. Write an equation to represent the cost of the ferry based on the number of people on the bus, explain what the slope and y-intercepts represent in the context of the problem, and then determine what it will cost for a bus with 40 people on board.

Find the cost for 40 people, write an equation to represent cost per person, and find/explain the slope and the y-intercept.

$m = \frac{y_2 - y_1}{x_2 - x_1}$ (30, 180) (50, 220)

$m = \frac{180 - 220}{30 - 50} = \frac{-40}{-20} = 2$

The slope is 2 and represent the cost per person. They charge $2.00 per person.

$y - y_1 = m(x - x_1)$ $m = 2$ (30, 180)

$y - 180 = 2(x - 30)$

$y - 180 = 2x - 60$

$+180 \quad +180$

$y = 2x + 120$

y-intercept = 120
The company charges a $120.00 fee to ferry the empty bus

Find y when $x = 40$

$y = 2 \cdot 40 + 120$

$y = 80 + 120$

$y = \$200.00$

The ferry will charge $200.00 for a bus with 40 people

Bonus: Plug in 200 and solve for x

$200 = 2x + 120$

4. Last year Ms. Brown rented a banquet hall for $150.00 to celebrate the end of the school year with 30 teachers from around the valley. This year that same banquet hall will charge her $270.00 for the 70 teachers that will be attending. Write an equation to represent the cost of the banquet hall based on the number of people attending, explain what the slope and y-intercepts represent in the context of the problem, and then determine what it will cost for a party with 50 teachers attending.

Find an equation to represent the cost of the banquet hall, explain the slope & y-intercept, and then Find the cost for a party with 50 teachers.

$(30, 150)$ $(70, 270)$

$$m = \frac{270 - 150}{70 - 30} = \frac{120}{40} = 3$$

Slope = 3 This means the banquet hall charges $3.00 per teacher

$y - y_1 = m(x - x_1)$

$y - 150 = 3(x - 30)$

$y - 150 = 3x - 90$

$+150 \quad +150$

$y = 3x + 60$

y-intercept = 60
This means the banquet hall has a flat (base) fee of $60.00 to use their facility

Find y when $x = 50$

$y = 3(50) + 60$

$y = 150 + 60$

$y = 210$

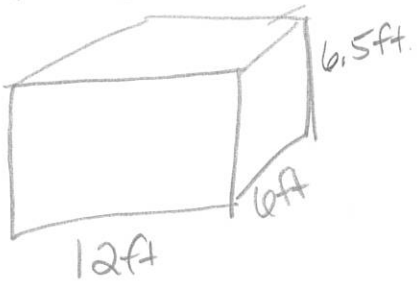
It will cost $210.00 for a party with 50 teachers

Geometry Volume Problems G.GMD.3

1. Ms. Brown is hauling water from Butte Falls to fill her storage tank at her house that is 6 feet wide by 6.5 feet deep, by 12 feet. If the tank she has in her truck has a diameter of 5.1 feet and a height of 3.4 feet, how many trips will she need to make to fill her tank?

How many trips are need?

Home Tank



$V_H = lwh$

$V_H = 12 \cdot 6 \cdot 6.5$

$V_H = 468\ ft^3$

$Trips = \frac{V_H}{V_T}$

$Trips = \frac{468}{69.45590118}$

$Trips = 6.738088837$

Ms. Brown has to take 7 trips to fill her tank.

$d = 2r$

$\frac{5.1}{2} = \frac{2r}{2}$

$r = 2.55$

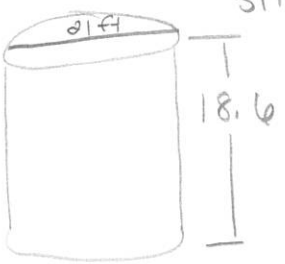
$V_T = \pi r^2 h$

$V_T = \pi \cdot 2.55^2 \cdot 3.4$

$V_T = 69.45590118$

2. A farmer is installing a grain silo to store grain to feed his animals that has diameter of 21 feet and a height of 18.6 feet. If his dump truck bed is 4 feet wide by 8 feet long by 10.5 feet deep how many truck loads will it take to fill the grain silo?

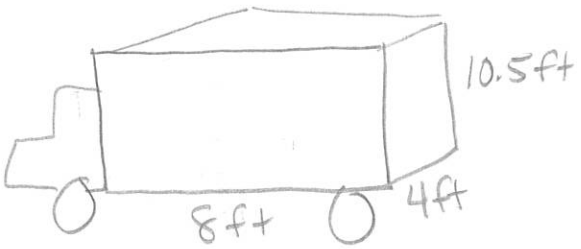
How many truck loads will it take to fill the silo



$d = 2r$

$\frac{21}{2} = \frac{2r}{2}$

$10.5 = r$



$V_S = \pi r^2 h$

$V_S = \pi \cdot 10.5^2 \cdot 18.6$

$V_S = 6442.306975\ ft^3$

$V_T = lwh$

$V_T = 8 \cdot 4 \cdot 10.5$

$V_T = 336\ ft^3$

$$Trips = \frac{V_{silo}}{V_{truck}}$$

$$Trip = \frac{6442.306975}{336}$$

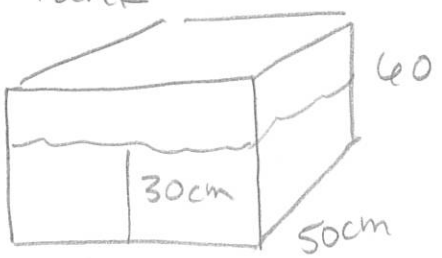
$Trips = 19.173532646$

The farmer will need to make 20 trips to fill his silo.

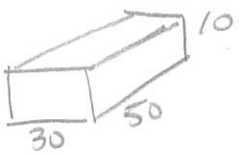
3. An aquarium has a rectangular base that measures 100 cm by 50 cm and has a height of 60 cm. It is filled with water to a height of 30 cm. A brick with a rectangular base that measures 50 cm by 30 cm and a height of 10 cm is placed in the aquarium. How many centimeters does the water rise?

How much does the water rise with the brick

Tank



Brick



$V_B = l w h$

$V_B = 30 \cdot 50 \cdot 10$

$V_B = 15000 cm^3$

$V_w = l \cdot w \cdot h$

$V_w = 100 \cdot 50 \cdot 30$

$V_w = 150000 cm^3$

$V_T = V_w + V_B$

$V_T = 150000 + 15000$

$V_T = 165000 cm^3$

width and length don't change only height Find new height

$V_T = l \cdot w \cdot h$

$165,000 = 100 \cdot 50 \cdot h$

$\frac{165000}{5000} = \frac{5000 \cdot h}{5000}$

$33 = h$ new height = 33 cm

New Height - Old Height = water level Rise

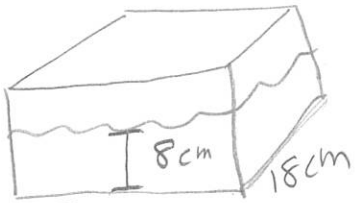
$33 - 30 =$ 3cm

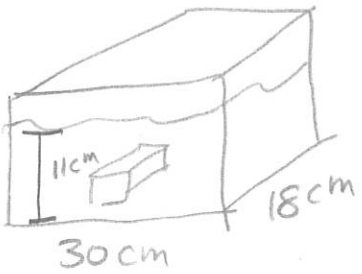
The water level rose 3cm

4. A rectangular fish tank, 30 cm long and 18 cm wide, is filled with water to a depth of 8 cm. When a brick of unknown size is completely submerged in the water, the water level rose up to 11 cm with no water splashing out. What is the volume of the brick?

I need to find the volume of the brick.

$V = \ell w h$





$V_{nobrick} = 30 \cdot 18 \cdot 8$

$V_{nobrick} = 4320\ cm^3$

$V_{Brick}^{with} = 30 \cdot 18 \cdot 11$

$V_{Brick}^{with} = 5940\ cm^3$

$V_{Brick} = V_{w/Brick} - V_{nobrick}$

$V_{Brick} = 5940 - 4320$

$V_{Brick} = 1620\ cm^3$

The volume of brick is $1620\ cm^3$

Test Check $1620 \stackrel{?}{=} 5940 - 4320$