

Name:

Quiz A

Instructions: Answer all of the questions as best as you can. Show all your work and make it clear what your answer is. Calculators are allowed, but not graphing calculators.

1. Simplify the following expression:

$$\frac{a^{-6}b^4}{(abc^2)^3} \cdot (a^{-3}c)^2 = \frac{a^{-6}b^4a^{-6}c^2}{a^3b^3c^6} = a^{-15}bc^{-4}$$

2. Solve for t in the following:

$$\frac{2 - 7t}{4} = -\frac{t}{7}$$

$$-4t = 7(2 - 7t)$$

$$-4t = 14 - 49t$$

$$45t = 14$$

$$t = \frac{14}{45}$$

3. At a gas station in Mexico, the price of gasoline is 8.2 pesos per liter. What is the price in dollars per gallon? (1 dollar = 10.9 pesos, 1 gal = 3.785 liters)

$$\left(8.2 \frac{\text{peso}}{\text{liter}}\right) \left(\frac{1 \text{ dollar}}{10.9 \text{ peso}}\right) \left(\frac{3.785 \text{ liter}}{1 \text{ gal}}\right) = 2.84 \frac{\text{dollars}}{\text{liter}},$$

so gas costs \$2.84 per gallon.

4. A professor reports that the students' average improved by 15% one year. The next year, however, the average dropped by 6%. How much did the average change over the 2 year period?

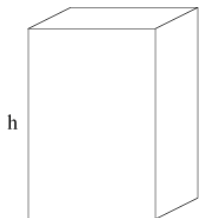
$$(1.15)(.94) = 1.081,$$

so the average rose 8.1% over the 2 years.

5. Suppose that \$2000 is deposited in a bank account having 2.5% annual interest, compounded yearly. What will the balance on the account be thirty years from now assuming no withdrawals and no further deposits are made?

$$\text{amount} = \$2000(1.025)^{30} = \$4195.13$$

6. The shape below with the given dimensions is a model of a storage tank. The model will be scaled down so that the tank will have a height of 4 feet. What will the surface area and the volume of the scaled down model be?



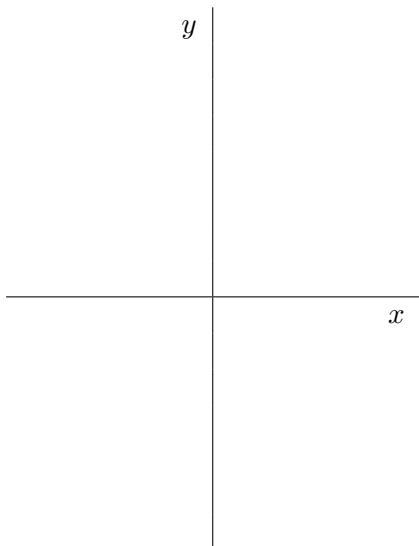
height = 12 ft
 surface area = 306 ft²
 volume = 324 ft³

the model is being scaled by one third. areas will then scale by $(1/3)^2$ and volumes will scale by $(1/3)^3$.

$$\text{new surface area} = 306 \text{ ft}^2 \left(\frac{1}{3}\right)^2 = 34 \text{ ft}^2$$

$$\text{new volume} = 324 \text{ ft}^3 \left(\frac{1}{3}\right)^3 = 12 \text{ ft}^3$$

7. Graph the line $3x - 7y = 14$. Find the slope of the line, the x -intercept and the y -intercept.



the x -intercept is where the y value is 0. so the x -intercept occurs when

$$3x = 14; \text{ that is, when } x = \frac{14}{3}.$$

the y -intercept is where the x value is 0. so the y -intercept occurs when

$$-7y = 14; \text{ that is, when } y = -2.$$

just draw a line through those two points.