

Quiz 1 **Solutions**, Math 103 - Precalculus

Solve each of the following. **Give a brief explanation with your solution.**

1. One cylinder has twice the base radius and three times the height of a second cylinder. What is the ratio of the volume of the first cylinder to the volume of the second cylinder?

Solution: If the second cylinder has radius r and height h , then the first cylinder has radius $2r$ and height $3h$, from the given information. The volumes of the first cylinder (V_1) and the second cylinder (V_2) are then:

$$V_1 = \pi(2r)^2(3h) = 12\pi r^2 h, \quad \text{and} \quad V_2 = \pi r^2 h.$$

Now the ratio of volumes is:

$$V_1 : V_2 = \frac{V_1}{V_2} = \frac{12\pi r^2 h}{\pi r^2 h} = 12 \quad \text{or} \quad 12 : 1.$$

2. Find the equation of the line which is parallel to the line with equation $2x + 4y = 3$ and which goes through the point $(1, 1)$.

Solution: The equation of the line given can be written as

$$4y = -2x + 3 \quad \text{or} \quad y = -\frac{1}{2}x + \frac{3}{4}.$$

The given line thus has slope $-\frac{1}{2}$, and so the line we want, being parallel to this one, has the same slope. The equation of the line we want thus has equation of the form

$$y = -\frac{1}{2}x + b,$$

where b is the y -intercept of the line. We can find b by using the fact that the point $(1, 1)$ is on the line, so that the values $x = 1$ and $y = 1$ must satisfy the equation. That is, we have

$$1 = -\frac{1}{2}(1) + b, \quad \text{and so} \quad b = 1 + \frac{1}{2} = \frac{3}{2}.$$

Now, we have that the equation of the line we are asked to find is $y = -\frac{1}{2}x + \frac{3}{2}$.