**Equivalent Figures**

Are these two lines equivalent – that is, are they the same? Why or why not.

10 cm

10 cm

Are these two figures equivalent? What makes them equal to each other?

10 m

3 m

5 m

3 m

Figures are equivalent when they have the same area.

Atriangle = $\frac{b • h}{2}$

Atriangle = $\frac{10 • 3}{2}$

Atriangle = $15$m2

Arectangle = L × W

Arectangle = 5 × 3

Arectangle = 15m2

Are these two solids equivalent? What makes them equal to each other?

2 cm

2 cm

6 cm

2 cm

2 cm

2 cm

Solids are equivalent when they have the same volume

Vcube = s3 Vpyramid = $\frac{Ab • h}{3}$

Vcube = 23 Vpyramid = $\frac{(2 •2) • 6}{3}$

Vcube = 8 cm3 Vpyramid = 8cm3

***Example #1***

Determine if these figures / solids are equivalent.

6

9

4



***Example #2***

A cone and a cylinder are equivalent. The radius and the height of the cone measure 6cm and 10cm respectively. What is the height of the cylinder if its radius measures 5cm?

**Step 1 – Draw the solids and label their given dimensions**



6cm

10cm

5cm

**Step 2 – Given that they are equivalent (same volume) determine the volume of the shape with the most information (cone)**

V = $\frac{πr^{2}•h}{3}$ V = $\frac{π6^{2}•10}{3}$ V = $\frac{π36 •10}{3}$ V = 376.99cm3

**Step 3 – Plug the found volume into the formula for the other solid (given that they are equal) and work backwards to determine the missing measure**

V = $πr^{2}•h $ 376.99 = $π5^{2}•h $ 376.99 = $π25•h$

376.99 = $78.5•h$ 376.99 = 78.5h $\frac{376.99 }{78.5}$ = $\frac{78.5h }{78.5}$ h = 4.8

***Example #3***



***Example #4***

A rectangular plot of land, with dimensions 45m by 20m, and a square plot of land have the same area. The cost, per meter of fencing, is $25. Which plot of land is cheaper to fence in?

***Example #5***

1. The square and the triangle below are equivalent. What is the area of each figure if the perimeter of the square is 30cm?
2. What is the length of the base of the triangle?

***Example #6***

Are the following solids equivalent?

12

10

10

40

20

8

5

***Example #7***

The sphere and the cylinder below are equivalent. Determine the radius of the sphere.

10

4