Agenda for Math 005.003 (27 April 2020, 11–11:50 am

1. Work on Worksheet 5

1. Note that one yard is three feet. Assume that a day is exactly 24 hours. Alice runs at a speed of 10 feet per second. What is this speed in units of yards and days?

2. Water leaks from a faucet at a rate of .2 cubic yards per week. How many cubic inches does it leak per minute?

① $\frac{10\ ft}{1\ sec} \cdot \frac{1\ yd}{3\ ft} \cdot \frac{60\ sec}{1\ min} \cdot \frac{60\ min}{1\ hr} \cdot \frac{24\ hr}{1\ day}$

(each ↑ = 1)

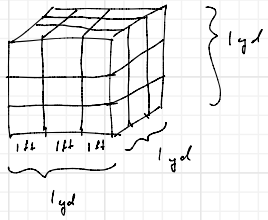
$= \frac{10 \cdot 60 \cdot 60 \cdot 24}{3} \frac{yd}{day} = \boxed{8 \cdot 10 \cdot 60^2 \frac{yd}{day}}$

$= 288{,}000 \frac{yd}{day}$

② $\frac{0.2\ yd^3}{1\ wk} \cdot \frac{1\ wk}{7\ day} \cdot \frac{1\ day}{24\ hr} \cdot \frac{1\ hr}{60\ min} \cdot \left(\frac{36\ in}{yd}\right)^3 = \cdots$

Are there $3\ ft^3$ in $1\ yd^3$? No!

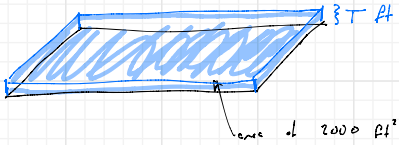
The number $\frac{3\ ft}{1\ yd} = 1 \Rightarrow 1^3 = \left(\frac{3\ ft}{1\ yd}\right)^3 = \frac{27\ ft^3}{1\ yd^3}$



$\frac{0.2\ yd^3}{1\ wk} \cdot \frac{1\ wk}{7\ day} \cdot \frac{1\ day}{24\ hr} \cdot \frac{1\ hr}{60\ min} \cdot \left(\frac{3\ ft}{1\ yd}\right)^3 \cdot \left(\frac{12\ in}{1\ ft}\right)^3 = \cdots$

3. A painter needs two cubic feet of paint to paint a wall with an area of 2000 square feet. The painter now needs to paint a wall with an area of 2000 square yards. How many cubic yards of paint does he need?

$\frac{2\ ft^3\ of\ paint}{2000\ ft^2\ of\ wall} \cdot \left(\frac{3\ ft\ of\ wall}{1\ yd\ of\ wall}\right)^2 \cdot \left(\frac{1\ yd\ of\ paint}{3\ ft\ of\ paint}\right)^3 = ???\ \frac{yd^3\ of\ paint}{yd^2\ of\ wall}$



Vol of paint
$= (2000\ ft^2)(T\ ft)$
$= 2000\ T\ ft^3$
$= 2\ ft^3$

$\Rightarrow T\ ft = \frac{1}{1000}\ ft$

$Vol = (2000\ yd^2)(T\ ft) = (2000\ yd^2)\left(\frac{1}{1000}\ ft\right)\left(\frac{1\ yd}{3\ ft}\right)$

$= \boxed{\frac{2}{3}\ yd^3}\ \left(\frac{3\ ft}{1\ yd}\right)^3$

$= \frac{3^2 \cdot 2}{3}\ ft^3 = \boxed{18\ ft^3}$

WTK: How much paint per ft^2?

Volume of paint = (Area being painted)(Volume per $1\ ft^2$)

units of length: $\frac{vol}{ft^2} = \frac{ft^3}{ft^2} = ft$