

Quiz Next Week? ~~XXXXXXXXXX~~

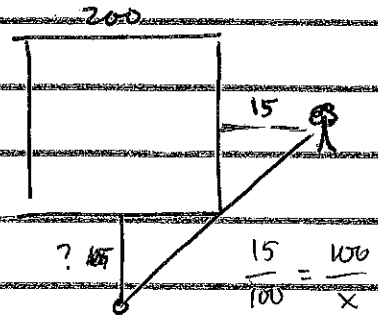
# Hist Notes 5

1. Find all integers that leave a remainder of 2 when divided by 9, and a remainder of 6 when divided by 11.

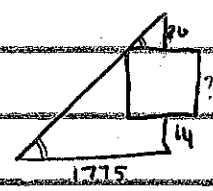
2. Prove these results of Abu Abdallah Ya'is ibn Ibrahim Al-Umawi (1400-1489):

- (i) If  $n$  leaves a remainder of 5 when divided by 10, then  $n^2$  leaves a remainder of 25 when divided by 100.
- (ii) If  $n$  is a perfect cube, the  $n^3$  leaves a remainder of 0, 1, or 6 when divided by 7. (~~Hint:  $n = 7q + r$~~ )

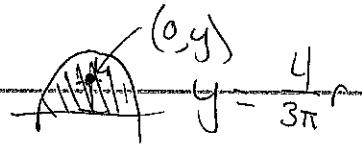
3. A square-walled city measures 200 paces on each side. Gates are located at the center of each side. If there is a tree 15 paces east of the east gate, how far must someone walk <sup>South</sup> out the south gate to see the tree?



4. A <sup>square</sup> walled ~~city~~ city of unknown size has gates located at the center of each side. A tree stands 20 paces north of the north gate. A woman walks 14 paces south out the south gate, then <sup>has to run</sup> ~~starts~~ a distance of 1775 paces due west before she can see the tree. What are the dimensions of the city?



$$\frac{1775}{14 + ? + 20} = \frac{?/2}{20}$$



First/ Using Pappus' Centroid theorem, what is the center of mass of the solid half-disk <sup>defined as</sup> ~~bounded~~ the intersection of the regions ~~between the curves~~  $y=0$  and  $x^2+y^2 \leq 1$ .

And/ Using " , find the volume of the solid formed by rotating a triangle with vertices  $(0,0)$   $(3,0)$   $(0,4)$  about the  $x$ -axis.



Pappus' Volume = (Bounded area)  $\times$  (distance travelled by center of mass).

