1. A domino has a left end and a right end, each of certain color. Alice has four dominos, colored R-R, R-B, B-R, B-B. Find the number of ways to arrange the dominos in a row end-to end such that adjacent ends have same color. Dominos can't be rotated?

Sol

| R | R | | R | B | | B | R | | B | B |

RR RB BB BR - (1)

RB BB BR RR - (2)

BR RR RB BB - (3)

BB BR RR RB - (4)

4 combination.

2.) suppose 'a' and 'b' are +ve Int for which $8a^ab^b = 27a^bb^a$. Find a^2+b^2

$\cancel{8a^bb^a}$ $8a^ab^b = 27a^bb^a$

$8a^ab^b = 27a^bb^a$

$$\frac{a^ab^b}{a^bb^a} = \frac{27}{8}$$

$$a^{a-b}\cdot b^{b-a} = \left(\frac{3}{2}\right)^3$$

$$\frac{a^{a-b}}{b^{a-b}} = \left(\frac{3}{2}\right)^3$$

$\frac{a=3}{b=2}$

$a-b=3$

$\frac{a}{b} = \frac{3}{2}$

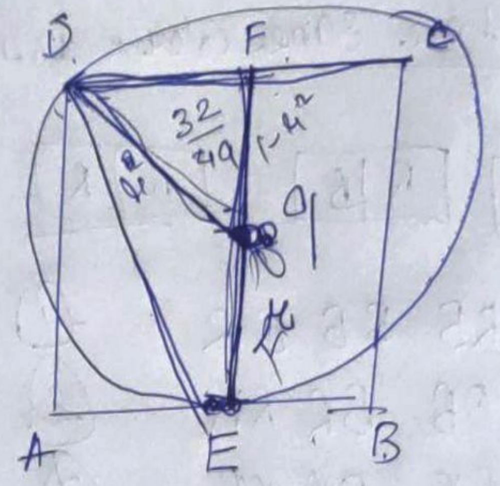
$\boxed{a=9 \mid b=6}$

$a^2+b^2 = 117$

Q3. Let ABCD be a unit square. A circle rad

$\frac{32}{49}$ passes thru pt D and is tangent to AB at

Then $DE = \frac{m}{2}$, $\gcd(m,n)=1$. Find $100m+n$



$OD = \frac{32}{49}$ $\quad DE = \frac{m}{2}$ $\quad \gcd(m,n)=1$

$OE = r$ $\quad \underbrace{DF}_{}^2 + OF^2 = r^2$

$x^2 + OF^2 = r^2$

$OF = (1-r)$

$x^2 + (1-r)^2 = r^2$

$x^2 + 1 - 2r = 0$

$1 + x^2 = 2r$

Now for DE

$EF = 1$

$DF = 2r-1$

$DE = \sqrt{DF^2 + EF^2} = \sqrt{1+x^2}$ or $\sqrt{2r}$

$r = \frac{32}{49}$ $\quad DE = \sqrt{2\left(\frac{32}{49}\right)}$

$\sqrt{\frac{64}{49}} = \frac{8}{7}$

$DE = \frac{8}{7}$

$\frac{m}{n} = \frac{8}{7}$ $\quad \boxed{\cancel{m = \frac{16}{7}}}$ $\quad \frac{m}{n} = \frac{8}{7}$ $\quad m = 8$, $n = 7$ $\quad \boxed{100(8) + 7 = 807}$