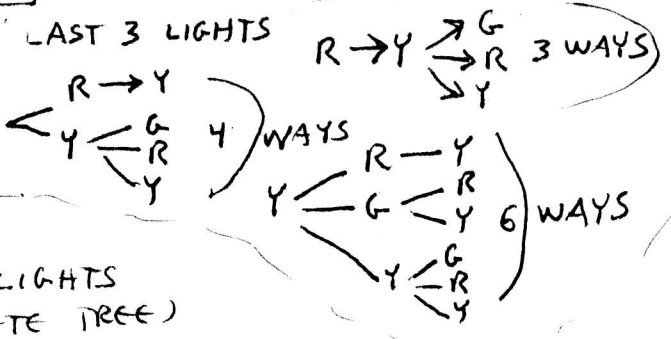
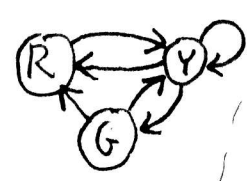
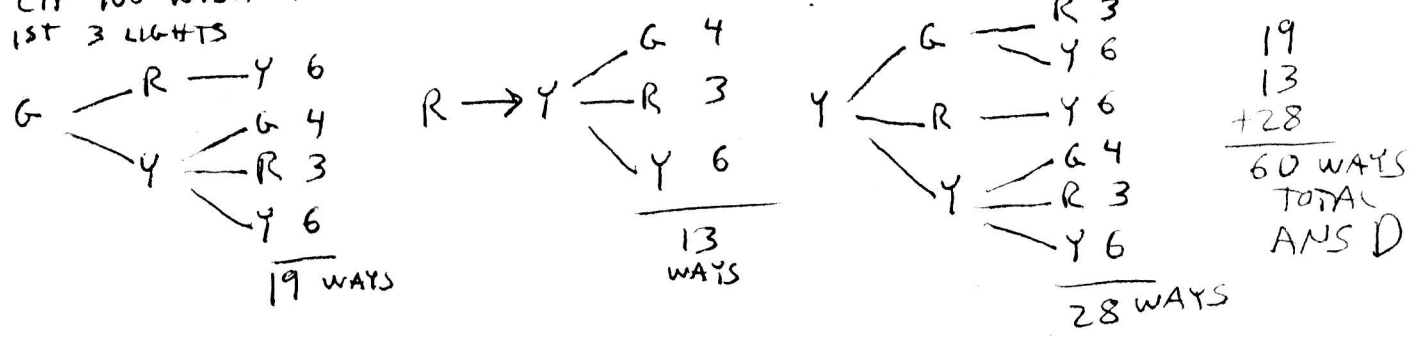


16
D

THE DIRECTED GRAPH
USING THE NUMBER
OF WAYS FROM THE
LAST 3 LIGHTS
SUB TREES AS LABELS ON LIGHT 3



I LOOK AT THE 3 CASES OF 1ST 3 LIGHTS
(IF YOU WISH YOU CAN DO THE COMPLETE TREE)
1ST 3 LIGHTS



17
B

FACTOR $Y \neq 0$ $2Y(X^2+X)=0$ so $X^2+X=0$ GET $X=0$ OR $X=-1$ SUB INTO
 $Y(6X^2+Y^2+10X)=0$ IF $X=0$ $Y=0$ NOT ALLOWED SO IF $X=-1$ $6+Y^2-10=0$, $Y^2=4$
 $Y=\pm 2$ so SOL. SET $\{(-1, -2), (-1, 2)\}$ 2 PAIRS ANS B

18
A

WRITE AS $X^3+Y^3-(X+Y)=0$ FACTOR $(X+Y)(X^2-XY+Y^2-1)=0$
 LINE $X+Y=0$ OR QUADRATIC $X^2-XY+Y^2-1=0$ DISCRIMINANT $(-1)^2-4(1)(-1)=5$
 SO QUADRATIC IS AN ELLIPSE (OR CIRCLE) IF $DISC < 0$ ($Ax^2+Bxy+Cy^2$...
 $DISC = B^2-4AC$)
 ANS A

19
C

DIGITS 1, 5 OR 9 SUM IS 16 SO 19 OR NO 9 CASES 9511 OR 5551
 BY SEARCH 1591 = 37.43 LAST 2 DIGITS $9+1=10$ 12 WAYS 4 WAYS
 ANS C

20
D

LET F BE 4TH CORNER OF RECTANGLE, LET G ON DF AND AC
 LET H BE ON EF AND AC, LET $X=EH$, $Y=DG$
 THEN $\frac{X}{3} = \frac{Y}{8}$ $X = \frac{15}{8}$, $Y = \frac{8}{5}$, $Y = \frac{16}{5}$, AREA $BDGHE = \text{AREA}_{ABC} - (\text{AREA}_{CEH} + \text{AREA}_{ADG})$
 $\text{AREA}_{BDGHE} = \frac{1}{2} \cdot 8 \cdot 5 - (\frac{1}{2} \cdot 3 \cdot \frac{15}{8} + \frac{1}{2} \cdot 2 \cdot \frac{16}{5}) = \frac{1119}{80}$ ANS D