Name: _____ **Show work needed to justify your answer.** Date: _____

HW: # 33a: Math IBSL - Standard 32 - Independent and Dependent Events and Conditional Probability 5 points

1 There are 27 students in a class. Of the students, 15 take film and 20 take theatre, and four do neither subject.

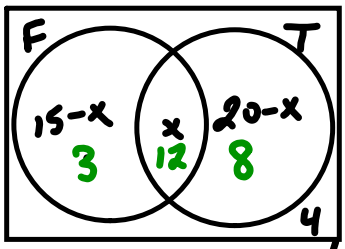
a How many students take both subjects?

b One person is chosen at random. Find the probability that the person:

i takes theatre but not film

ii takes at least one of the two subjects

iii takes theatre given that they take film.



(a) $15-x+x+20-x+4=27$

$-x+39=27$

$x=12$

b(i) $P(T\cap F')=\frac{8}{27}$

b(ii) $P(\text{AT least})=\frac{23}{27}$

b(iii) $P(T|F)=\frac{P(T\cap F)}{P(F)}=\frac{12}{15}=\frac{4}{5}$

2 A number is chosen at random from this list of eight numbers:

1 2 6 7 11 14 24 29

Find:

a P(it is even | it is not a multiple of 4)

b P(it is less than 15 | it is greater than 5)

c P(It is less than 5 | it is less than 15) (3)

d P(it lies between 1 and 10 | it lies between 5 and 25)

a) $P(E|N)=\frac{P(E\cap M')}{P(M')}=\frac{3}{7}$

(b) $P(L15|G5)=\frac{P(15\cap 5)}{P(5)}=\frac{4}{6}=\frac{2}{3}$

(c) $P(L5|L15)=\frac{P(5\cap 15)}{P(15)}=\frac{2}{6}=\frac{1}{3}$

(d) $P(\overset{A}{1-10}|\overset{B}{5-25})=\frac{P(A\cap B)}{P(B)}=\frac{2}{5}$

5 J and K are independent events. Given that $P(J|K)=0.3$ and $P(K)=0.5$, find $P(J)$.

$P(J|K)=\frac{P(J\cap K)}{P(K)}$

$0.3=\frac{P(J\cap K)}{0.5}$

$P(J\cap K)=0.15$

$P(J\cap K)=P(J)(PK)$

$0.15=0.5P(J)$

$P(J)=0.3$