PreCalc Review

Exclude: 1b, 3d, 4, 5cd, 5e

1a; $P(x=6) = \frac{5}{36}$

2a. ii $P(X>6) = \frac{21}{36} = \frac{7}{12}$

3 iii $P(X=7 \mid X>6) = \frac{P(7 \cap >6)}{\frac{7}{12}\ P(x>6)} = \frac{\frac{6}{36}}{\frac{7}{12}} = \frac{6}{36} \cdot \frac{12}{7} = \frac{6}{21} = \frac{2}{7}$

~~4.~~ if $x = 6$ wins 3 pts

if $x > 6$ wins 1 pt.

if

2a. $P(A) = .2$, $P(A \cup B) = .5$

Mutually exclusive find $P(B)$ $(P(A \cap B) = 0)$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$.5 = .2 + .P(B) - 0$$

$$.3 = P(B)$$

2b. Given that A and B are independent, find $P(B)$

$$P(A \cap B) = P(A) \cdot P(B)$$

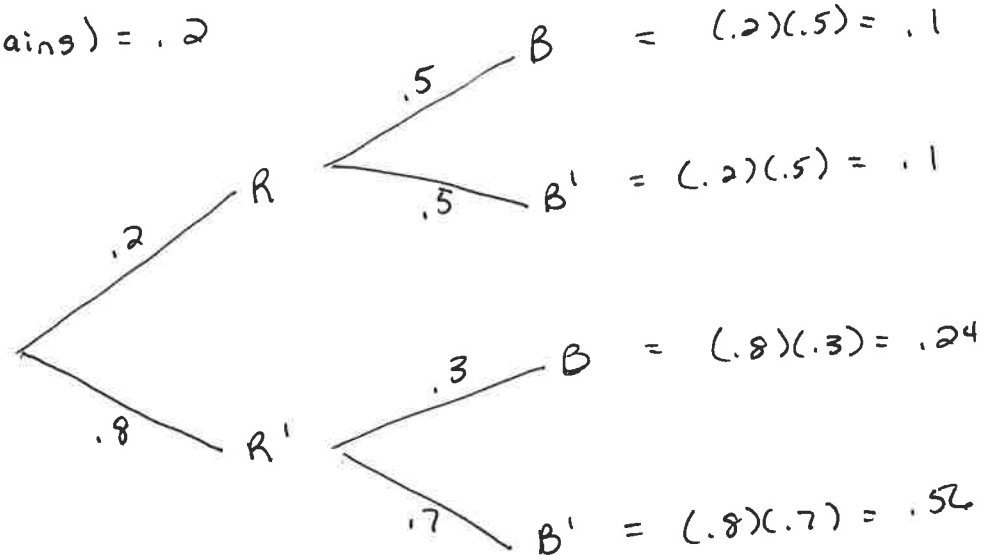
$P(A \cap B) = .2B$

$P(A \cup B) = .2 + P(B) - .2P(B)$

$.5 = .2 + P(B) - .2P(B)$

$P(B) = .375$

3a.



a) $P(Bus) = .1 + .24 = .34$

b) $P(Rain \mid Bus) = \frac{P(R \cap B)}{P(B)} = \frac{.1}{.34} = .294$ or $\frac{5}{17}$

c) $P(Bus\ 3\ days) = \underbrace{.34 \cdot .34 \cdot .34}_{Bus} \cdot \underbrace{.66 \cdot .66}_{not\ Bus} = .0171$

? ___ • ___

$P(not\ Bus) = 1 - P(Bus) = 1 - .34 = .66$

✗)

4. $P(\text{Defective}) = .05$

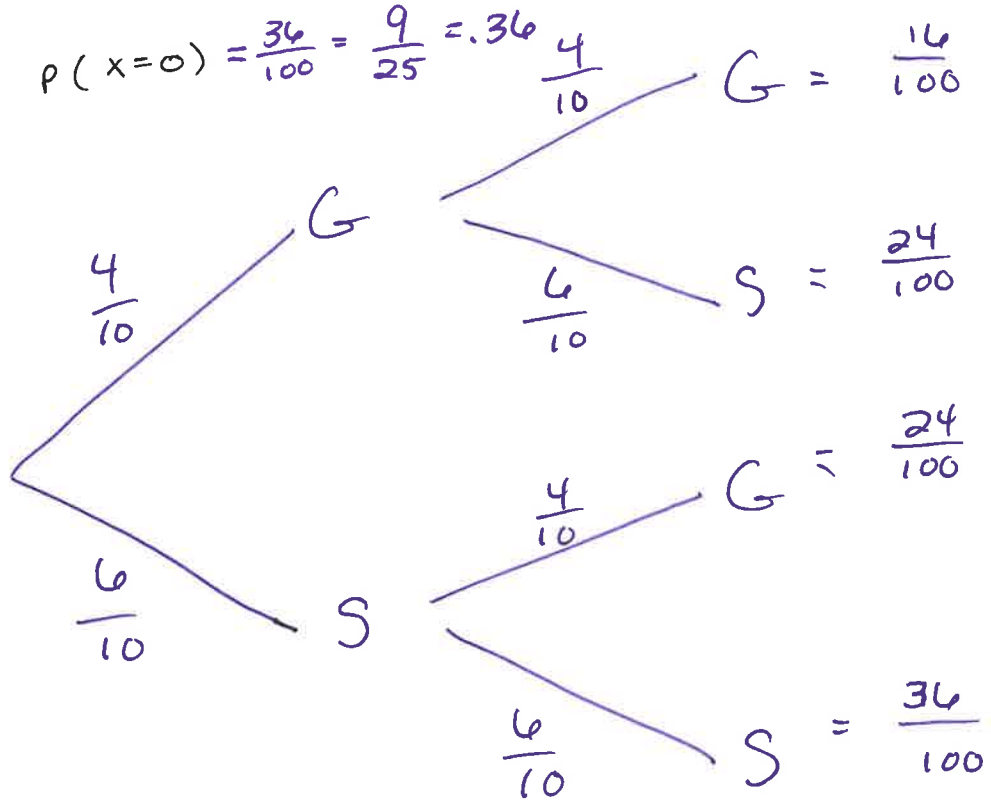
$n = 30$

a. $1 - P(\text{none}) = P(\text{at least one defective})$

5. 4 gold, 6 silver

Two pulled with replacement x = # of Gold balls

a. (i) $P(x=0) = \frac{36}{100} = \frac{9}{25} = .36$



(ii) $P(x=1) = P(1 \text{ Gold}) = \frac{24}{100} + \frac{24}{100} = \frac{48}{100} = \frac{12}{25} = .48$

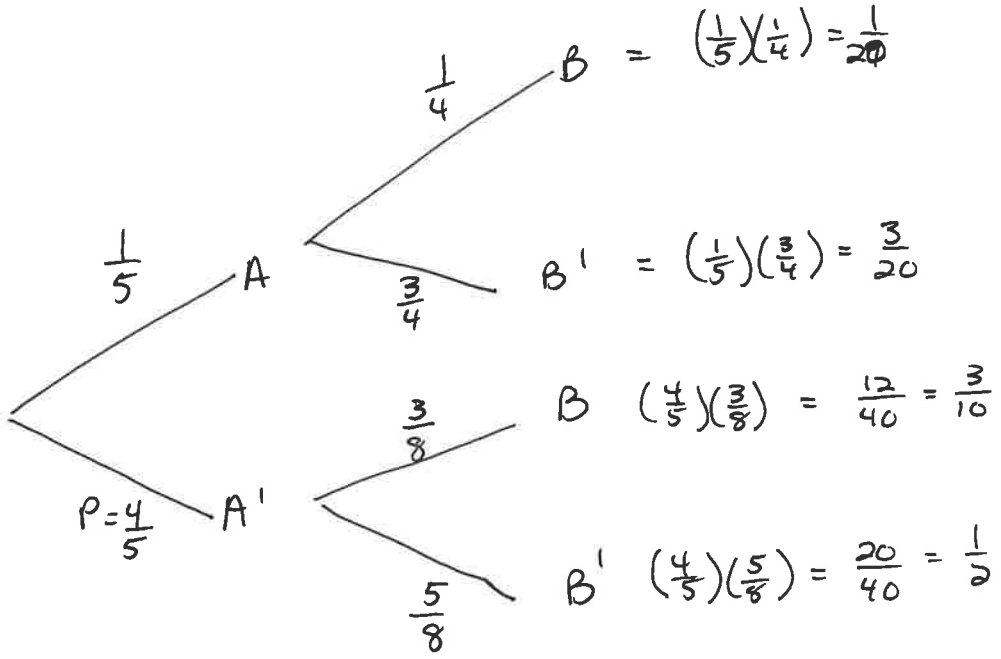
(iii) $E(x) = 2 \cdot .4 = .8$

b.

4. 14 balls drawn - with replacement

$P(x = 5)$ $P(x=1) = .48$

6.



$P = \frac{4}{5}$

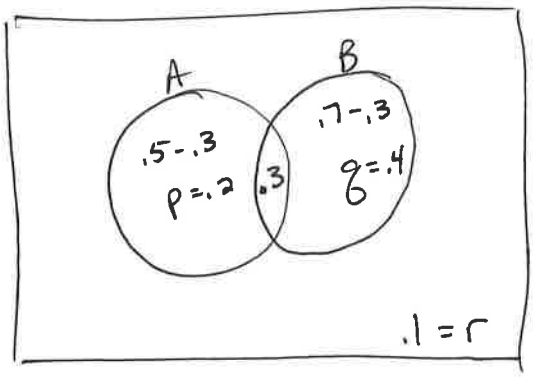
b. Find $P(B) = \frac{1}{20} + \frac{3}{10} = \frac{7}{20}$

c. Find $P(A' \mid B) =$

$P(A' \cap B) = \left(\frac{4}{5}\right)\left(\frac{3}{8}\right) = \frac{3}{10}$

$$P(A' \mid B) = \frac{\frac{3}{10}}{\frac{7}{20}} = \frac{3}{10} \cdot \frac{20^{2}}{7} = \frac{6}{7}$$

7. $P(A) = .5$, $P(B) = .7$, $P(A \cap B) = .3$



$p(A \cup B) = .2 + .3 + .4 = .9$

a.

(i) $p = .2$

(ii) $q = .4$

(iii) $r = 1 - .9 = .1$

b. $P(A \mid B') = \frac{P(A \cap B')}{P(B')} = \frac{.2}{.3} = \frac{2}{3}$

$P(B') = .2 + .1 = .3$

$P(A \cap B') = .2$

c. Show A and B are <u>not</u> independent:

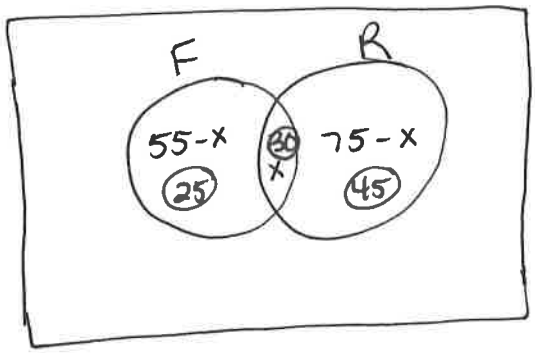
If independent, $P(A \cap B) = P(A) \cdot P(B)$

$.3 \stackrel{?}{=} (.5)(.7)$

$.3 \neq .35$ ∴ A and B are <u>not</u> independent

8. 100 boys, 55 football, 75 rugby, F = football
R = Rugby

$P(F \cup R)' = 0$



a)

(i) $55 - x + x + 75 - x = 100$

$130 - x = 100$

$-x = -30$

$x = 30$

(ii) Only Rugby = 45

b) $P(\text{only one sport}) = \frac{25+45}{100} = \frac{70}{100} = \frac{7}{10}$

c) Explain why F and R are <u>not</u> mutually exclusive

$P(A \cap B) = 0$ if mutually exclusive

$\frac{30}{100} \neq 0$ $\therefore$ <u>not</u> mutually exclusive

d) Show F and R are <u>not</u> independent

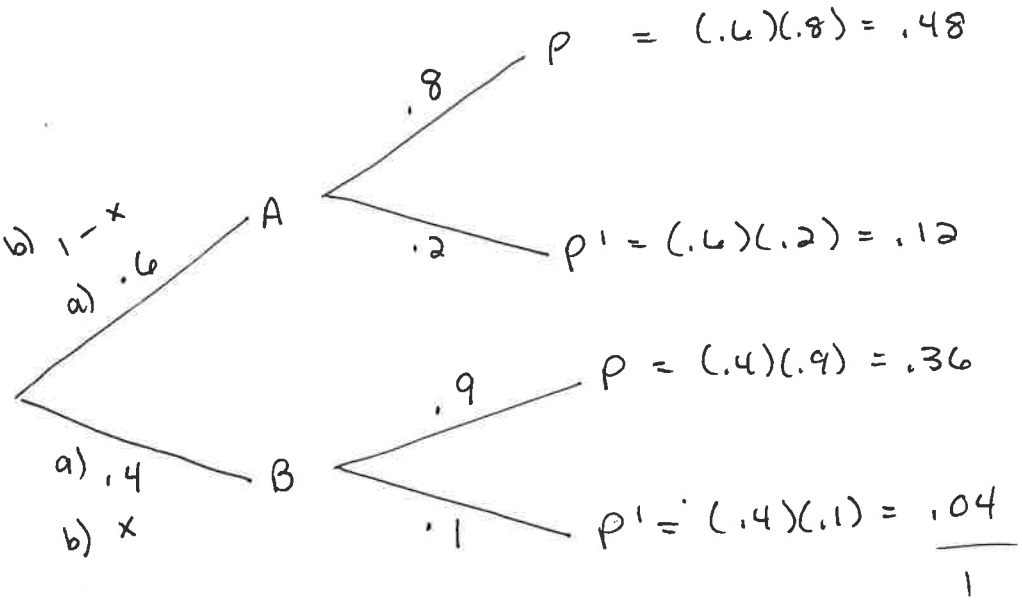
if independent, then $P(A \cap B) = P(A) \cdot P(B)$

and $\frac{30}{100} \neq \left(\frac{55}{100}\right)\left(\frac{75}{100}\right)$ $\therefore$ <u>not</u> independent

9.

.8 of A pass inspection — makes 60% of boxes
.9 of B pass inspection

a) Box is selected at random. Find P(passes)



P(Passes) = .48 + .36 = .84

b) Company ~~wants~~ P(Passes) to be .87

What percentage of boxes should be made by machine B?

P(B) = x, P(A) = 1 - x

$$x(.9) + .8(1-x) = .87$$
$$.9x + .8 - .8x = .87$$
$$.1x = .07$$
$$x = .7 \text{ or } 70\%$$