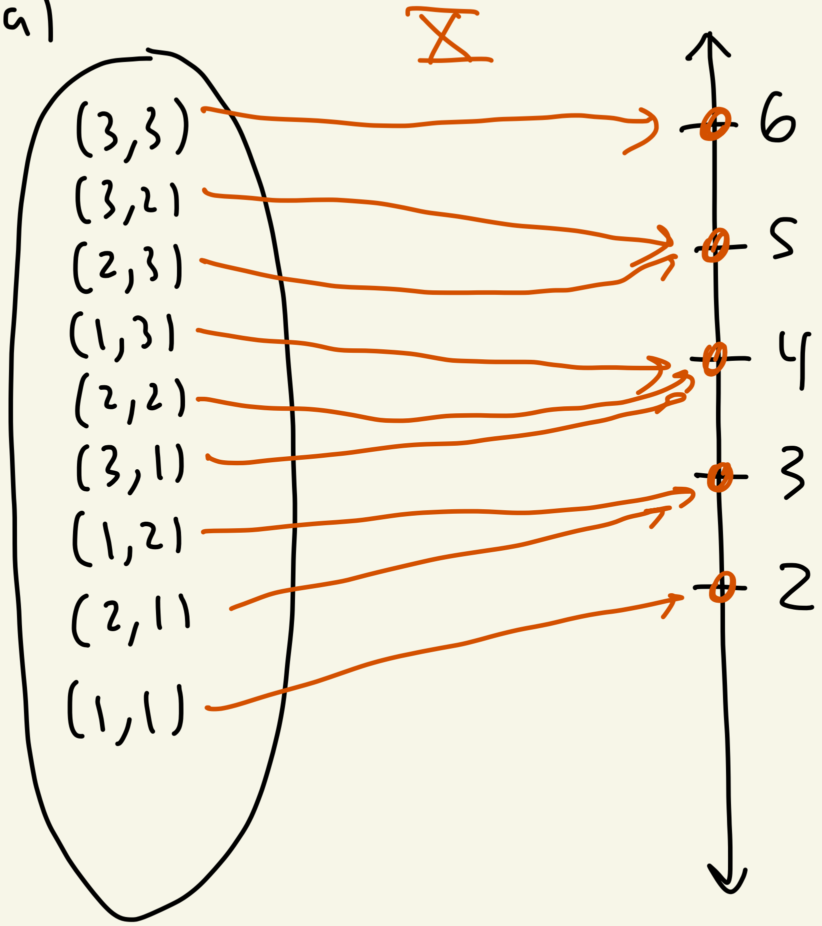
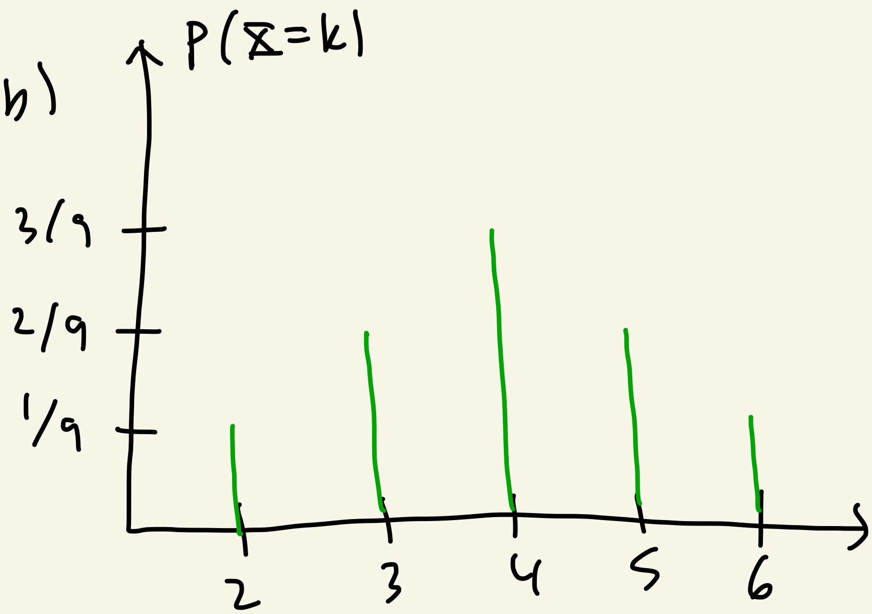
1 (a)



(b)

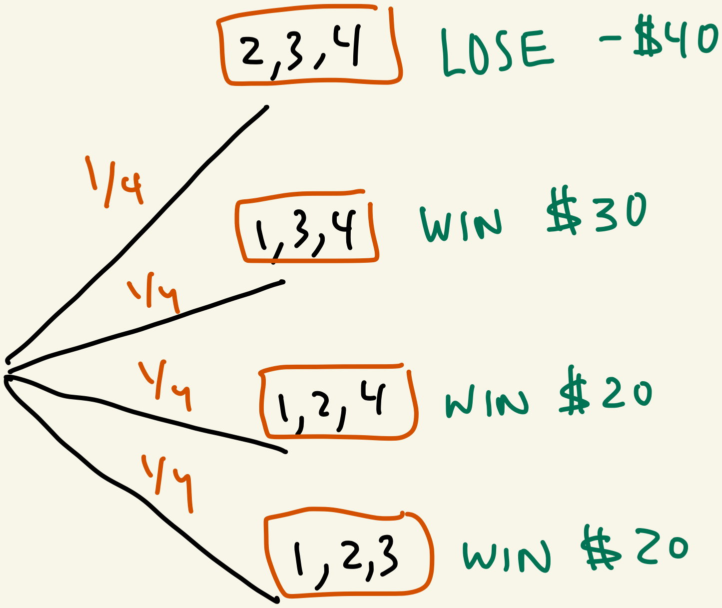


(c)

$$E[X] = (2)\left(\frac{1}{9}\right) + (3)\left(\frac{2}{9}\right) + (4)\left(\frac{3}{9}\right) + (5)\left(\frac{2}{9}\right) + (6)\left(\frac{1}{9}\right)$$

$$= \frac{2+6+12+10+6}{9} = \frac{36}{9} = \boxed{4}$$

2



$$E[X] = \frac{1}{4}(-\$40) + \frac{1}{4}(\$30) + \frac{1}{4}(\$20) + \frac{1}{4}(\$20)$$

$$= \frac{\$30}{4} = \boxed{\$7.5}$$

③ Let X be the number of times that you win.

$n=4,\ p=\frac{18}{38}=\frac{9}{19}$

$$P(X\geq 3)=P(X=3)+P(X=4)$$

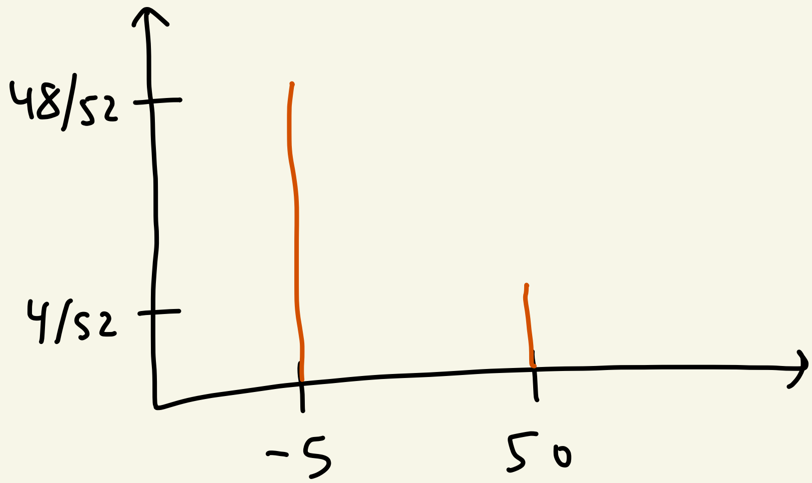
$$=\binom{4}{3}\cdot\left(\frac{9}{19}\right)^3\cdot\left(\frac{10}{19}\right)^1+\binom{4}{4}\cdot\left(\frac{9}{19}\right)^4\cdot\left(\frac{10}{19}\right)^0$$

$$=4\cdot\frac{9^3\cdot 10^1}{19^4}+1\cdot\frac{9^4}{19^4}$$

$$=\frac{4\cdot 9^3\cdot 10^1+9^4}{19^4}=\frac{29{,}160+6561}{130{,}321}$$

$$=\frac{35{,}721}{130{,}321}\approx\boxed{27.4\%}$$

④ (a) $P(X=k)$



(b)

$$E[X] = (-5)\left(\frac{48}{52}\right) + (50)\left(\frac{4}{52}\right) = \frac{-240+200}{52} = \boxed{\frac{-40}{52}}$$

$$\approx \boxed{-0.77}$$

(c)

$$E[X^2] = (-5)^2\left(\frac{48}{52}\right) + (50)^2\left(\frac{4}{52}\right) = \frac{1200+10000}{52}$$

$$= \frac{11200}{52} \approx \boxed{215.38}$$

$$\mathrm{Var}(X) = E[X^2] - (E[X])^2 = \frac{11200}{52} - \left(\frac{-40}{52}\right)^2$$

$$= \frac{36{,}300}{169} \approx 214.793$$

$$\sigma = \sqrt{\mathrm{Var}(X)} \approx \boxed{14.6558}$$

5 HW 7 - #2