

Question 1

$$(1 - 0.8 - 0.35 - 0.2) \rightarrow$$

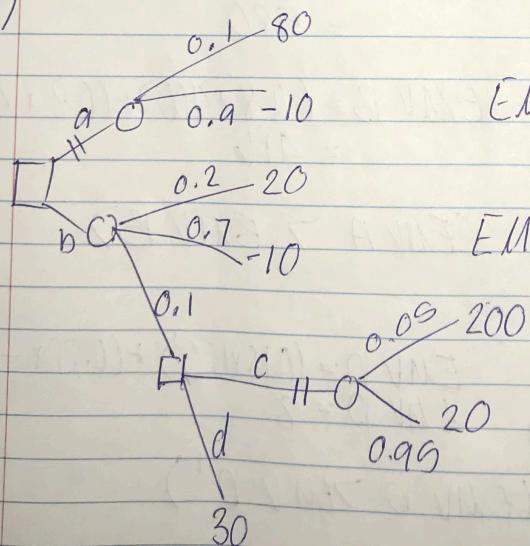
a) Probability	0.15	0.35	0.2	0.3	Name	EMV
Alternatives	High	Med	Low			
Lock down	180 u	150 u	130 u	120 u	141.9 u	
No Lock down	500 u	200 u	80 u	0	161 u	

$$b) EMV Lockdown = (180 \times 0.15) + (150 \times 0.35) + (130 \times 0.2) + (120 \times 0.3)$$
$$= 141.9 u$$

$$EMV \text{ No Lockdown} = (500 \times 0.15) + (200 \times 0.35) + (80 \times 0.2) + (0 \times 0.3)$$
$$= 161 u$$

Question 2

a)

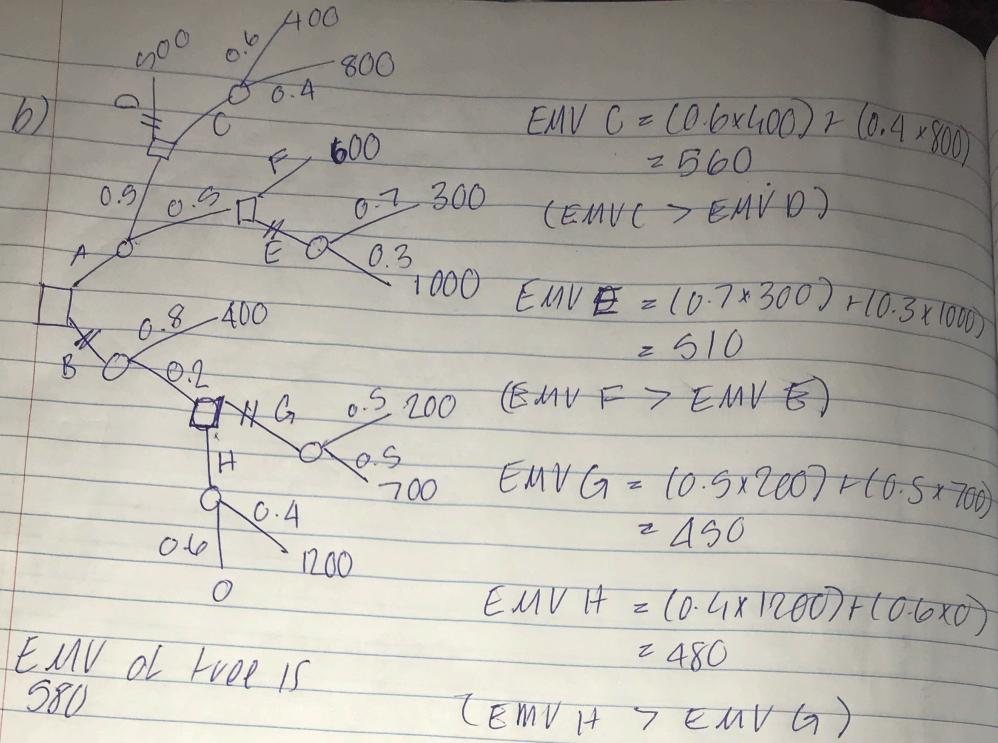


$$EMV A = (0.1 \times 80) + (0.9 \times -10)$$
$$= -1$$

$$EMV C = (0.05 \times 200) + (0.95 \times 20)$$
$$= 29 \quad (EMVA > EMVC)$$

$$EMV B = (0.2 \times 20) + (0.7 \times -10) + (0.1 \times 30)$$
$$= 0 \quad (EMVB > EMVA)$$

EMV of this tree map
is 0

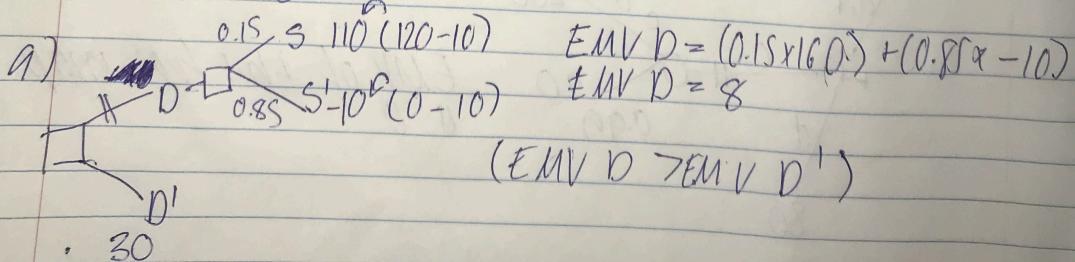


$$EMV A = (0.5 \times 560) + (0.5 \times 600)$$
 $= 580$

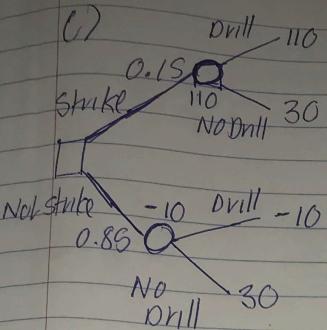
$$EMV B = (0.8 \times 400) + (0.2 \times 480)$$
 $= 416$

$(EMV A > EMV B)$

Aversion 3



- b) The best decision is to not drill with an expected return of \$30 000



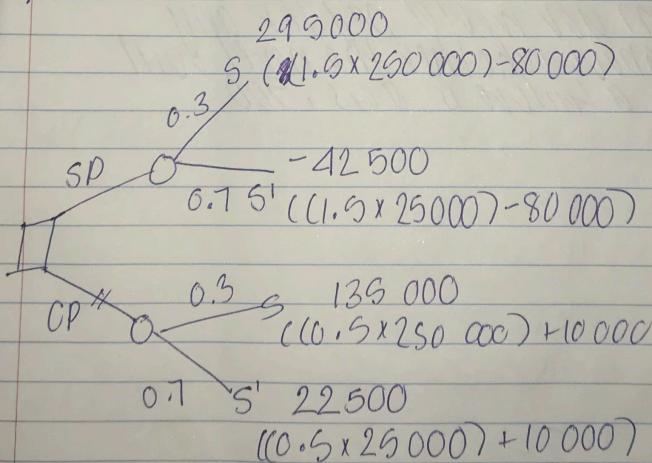
$$\text{EMV}_{\text{Perfect}} = (0.15 \times 110) + (0.85 \times 30) \\ = 42$$

$$\text{EMV}_{\text{EVPI}} = \text{EMV}(\text{Perfect}) - \text{EMV} \\ = 42 - 30 \\ = 12 \\ = \$12,000$$

- (a) EVPI shows the difference in value of your choice with and without perfect information. This is the ~~the~~ difference of the EMV from making the best decision without knowing the outcome ~~without perfect information~~
- hit or miss and the EMV from knowing if you'll hit or miss.

Question 4

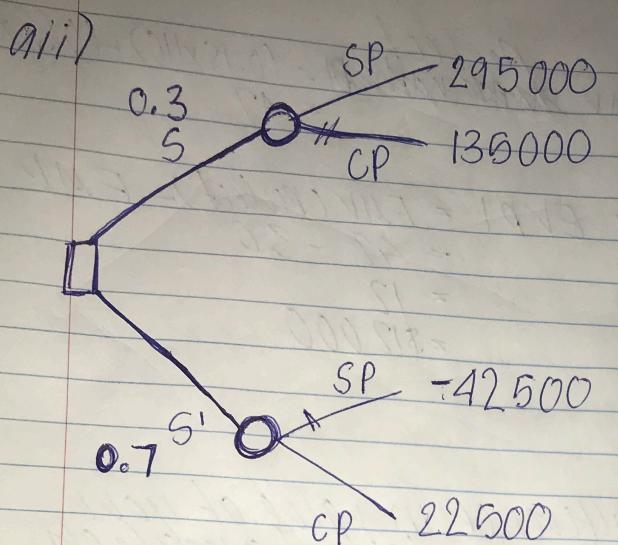
a.i)



$$\text{EMV}_{\text{SP}} = (0.3 \times 295000) + (0.7 \times -42500) \\ = \$58750$$

$$\text{EMV}_{\text{CP}} = \$56250$$

The best decision is self publishing as it has an expected return of \$58750



$$\begin{aligned} EMV_{Perfect} &= (0.3 \times 295000) + (0.7 \times 22500) \\ &= 164250 \end{aligned}$$

$$\begin{aligned} EVPI &= EMV_{Perfect} - EMV_{SP} \\ &= 164250 - 58790 \\ &= 95,900 \end{aligned}$$

The maximum you would pay for any information about whether the novel will be a success or a failure is \$95,900

$$\text{b) } P(\text{love} \mid \text{success}) = 0.6$$

$$P(\text{OK} \mid \text{success}) = 0.4$$

$$P(\text{love} \mid \text{fail}) = 0.1$$

$$P(\text{OK} \mid \text{fail}) = 0.9$$

$$P(\text{love}) = (P(\text{love} \mid \text{success}) \times P(\text{success})) + (P(\text{love} \mid \text{fail}) \times P(\text{fail}))$$

$$= (0.6 \times 0.3) + (0.1 \times 0.7)$$

$$= 0.25$$

$$P(\text{OK}) = (P(\text{OK} \mid \text{success}) \times P(\text{success})) + (P(\text{OK} \mid \text{fail}) \times P(\text{fail}))$$

$$= (0.4 \times 0.3) + (0.9 \times 0.7)$$

$$= 0.75$$

Baye's rule theorem

$$P(\text{success} \mid \text{love}) = \frac{P(\text{love} \mid \text{success}) \times P(\text{success})}{P(\text{love})}$$

$$= \frac{0.6 \times 0.3}{0.25} = 0.72$$

$$P(\text{fail} \mid \text{love}) = \frac{P(\text{love} \mid \text{fail}) \times P(\text{fail})}{P(\text{love})}$$

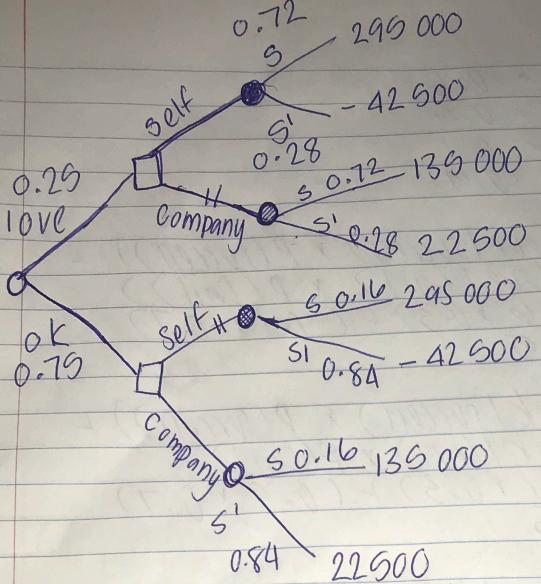
$$= \frac{0.1 \times 0.7}{0.25} = 0.28$$

$$P(\text{success} \mid \text{OK}) = \frac{P(\text{OK} \mid \text{success}) \times P(\text{success})}{P(\text{OK})}$$

$$= \frac{0.4 \times 0.3}{0.75} = 0.16$$

$$P(\text{fail} \mid \text{OK}) = \frac{P(\text{OK} \mid \text{fail}) \times P(\text{fail})}{P(\text{OK})}$$

$$= \frac{0.9 \times 0.7}{0.75} = 0.84$$



If the critic loves the book self publish for an EMV of \$200500

If the critic ok's the book company publish for an EMV of \$40500

These are the recommendations as those choices have the highest EMV in their respective branches

$$\bullet = (295000 \times 0.72) + (-42500 \times 0.28) \\ = 200500$$

$$\bullet = (135000 \times 0.72) + (22500 \times 0.28) \\ = 103500$$

$$\bullet = (295000 \times 0.16) + (-42500 \times 0.84) \\ = 11500$$

$$0 = (135000 \times 0.16) + (22500 \times 0.84) \\ = 40500$$

~~$$EVSI = 200500 + 103500 + 11500 + 40500$$~~

$$\begin{aligned} EVSI &= (200500 \times 0.29) + (40500 \times 0.75) \\ &= \$80500 \end{aligned}$$

- ii) The EVSI is the monetary amount the author is expected to make - given she uses the local literacy critic and that they provide their services for free.

The maximum amount she should be willing to pay
the clinic for their services is \$21750
- this is to ensure the cost of the clinic service
is less than the gain in EMV of the book

$$\text{EVSI} - \text{EMV} = 80500 - 58750 \\ = 21750$$