Example:

Johnny has £2500 in his bank account. He is invited for an interview in London for a one-off consultancy job. He has to spend £475 to attend this. He estimates that the probability of getting the job is 10%. If he gets the job, he will receive a one off payment of £3600. If he does not get the job, he just returns home with nothing.

If he decides not to attend the interview, he retains the £475 he would have spent. Johnny's preference is given by $\mathrm{u(X)} = \sqrt{X}$.

What will he decide ? Explain.

Calculate and show diagrammatically, the EU, CE, and his decision.

What is Johnny’s risk preference – i.e. is he risk averse, risk loving or risk neutral?

You can do the same question - if the probability of winning is 40%.

- $\mathrm{u(X)} = X^2$.

- If he does not go for the interview, his wealth is 2500, giving him a utility of $\sqrt{2500} = 50$

- If he does go for the interview,
  - and he does not get a job, his wealth is 2500-375= 2025, utility is $\sqrt{2025} = 45$
  - and he gets the job, his wealth is 2500-375 + 3600 = 5625, utility is $\sqrt{5625} = 75$

$$EW = 0.9 * 2025 + 0.1 * 5625 = 2385$$

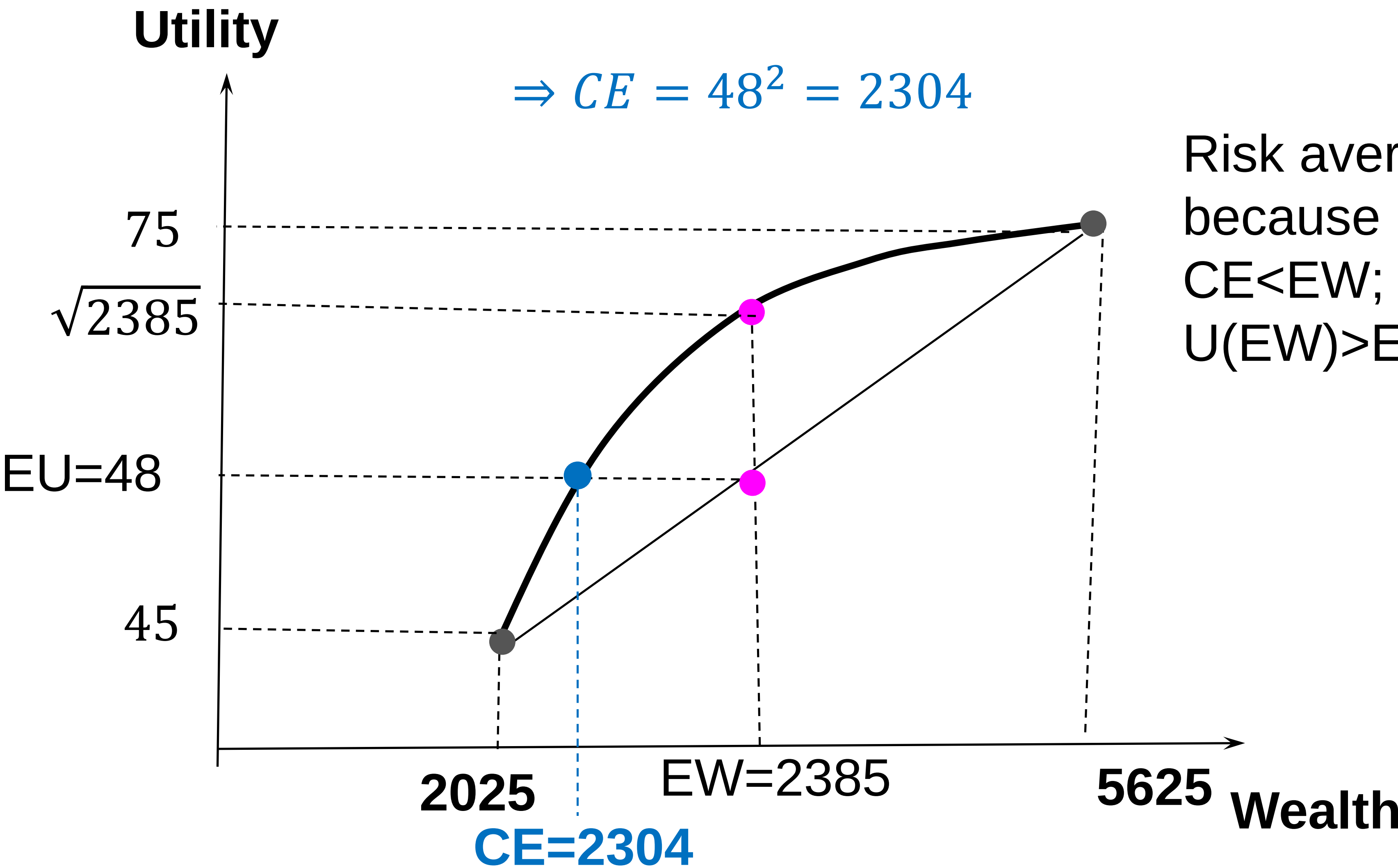
$$EU = 0.9 * 45 + 0.1 * 75 = 48$$

48 < 50. So he will not go for the interview.

EU=48. U(CE)=EU ➔ U(CE)=48

➔ $\sqrt{CE} = 48$

$\Rightarrow CE = 48^2 = 2304$



Risk averse because CE<EW; U(EW)>EU.

Example:

Geetha has wealth of £5000 and drives a car She estimates there is a 0.25 probability of an accident.

If there is an accident, she will lose £3000. Each £1 of accident insurance costs 20 pence (i.e. £0.2)

Geetha's utility function is $\mathrm{U(X)} = logX$. Analyse her decision making process.

state contingent budget constraint:

If £k of accident insurance is bought – pay premium 0.2k :

$$C_{na} = 5000 - 0.2k \qquad (1)$$

$$C_a = 2000 - 0.2k + k \qquad (2)$$

➔ $C_a - 2000 = 0.8k$ ➔ $k = \frac{C_a}{0.8} - 2500$

Substituting k into (1), $C_{na} = 5000 - 0.2\left(\frac{C_a}{0.8} - 2500\right)$

$$C_{na} = 5500 - 0.25\, C_a$$

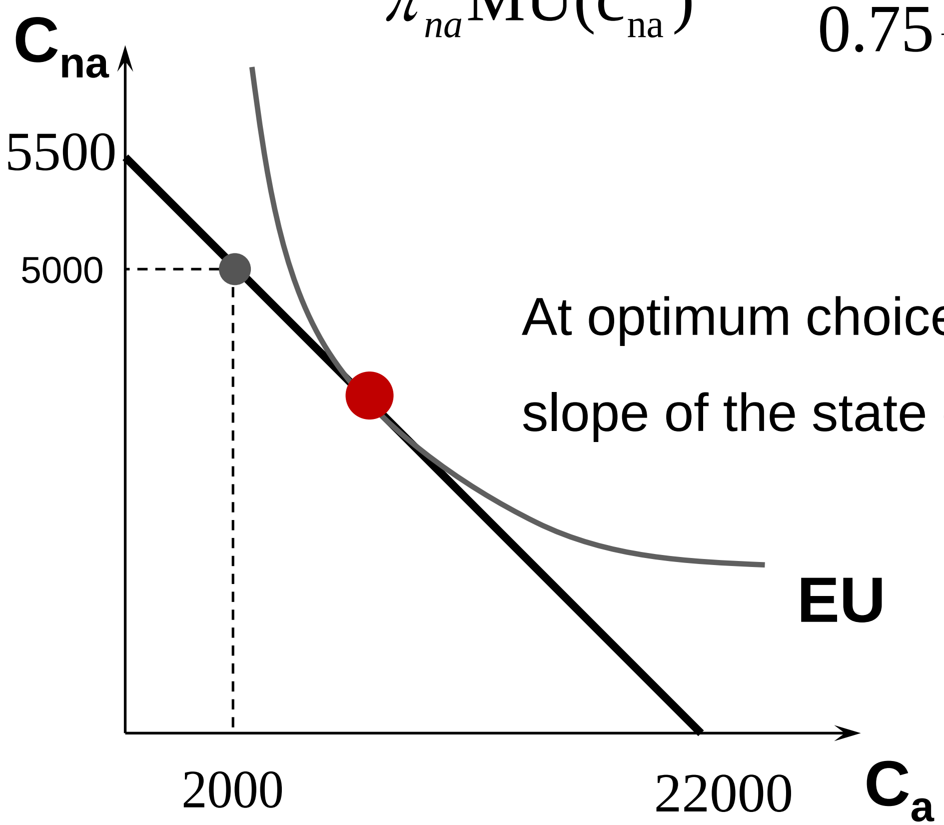
Therefore, slope of the state contingent budget constraint $= -\frac{1}{4}$

state contingent budget constraint:

$$C_{na} = 5000 - 0.2\left(\frac{C_a}{0.8} - 2500\right) \Rightarrow C_{na} = 5500 - 0.25\, C_a$$

MRS:

$$MRS = \frac{\pi_a \mathrm{MU}(c_a)}{\pi_{na} \mathrm{MU}(c_{na})} = -\frac{0.25 \frac{1}{2000+0.8k}}{0.75 \frac{1}{5000-0.2k}} = -\frac{1}{3}\frac{(5000-0.2k)}{(2000+0.8k)}$$



At optimum choice,

slope of the state contingent budget constraint = MRS

$$-\frac{1}{4} = -\frac{1}{3}\frac{(5000-0.2k)}{(2000+0.8k)}$$

$$6000+2.4k = 20000-0.8k$$

$$3.2k = 14000$$

$$k^* = 4375$$

Those who prefer to check the optimum choice of k to maximise EU, you will find the same answer.

$$\underset{k}{Max}\ \{0.25\log(5000-3000-0.2k+k)+0.75\log(5000-0.2k)\}$$

(Students can try to check what will happen if probability of accident is 0.2 or 0.1.
Different utility function etc.)