Probabilistic Graphical Models

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Home

Quizzes

Theory Problems

Assignments

Assignment Questions

Video Lectures

Discussion Forums

Course Wiki

Lecture Slides

Course Schedule

Course Logistics

Course Information

Course Staff

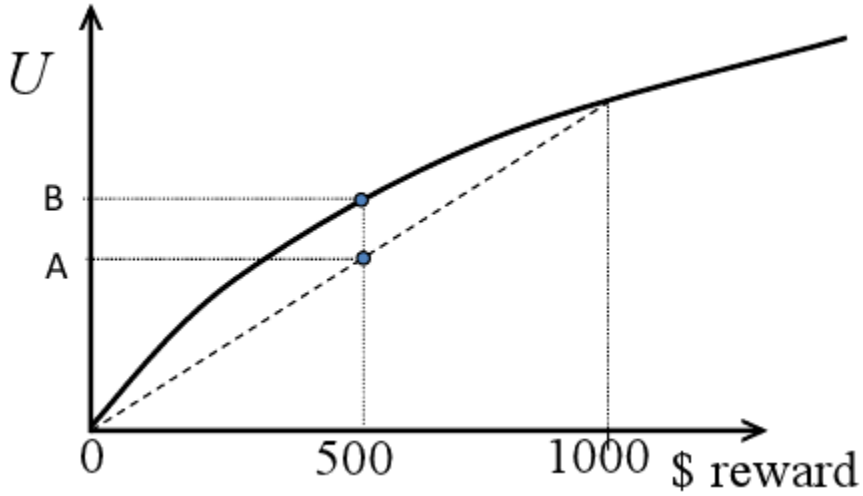
Octave Installation

Feedback — Decision Theory

You achieved a score of 5.00 out of 5.00

Question 1

Utility Curves. What does the point marked A on the Y axis correspond to? (Mark all that apply.)

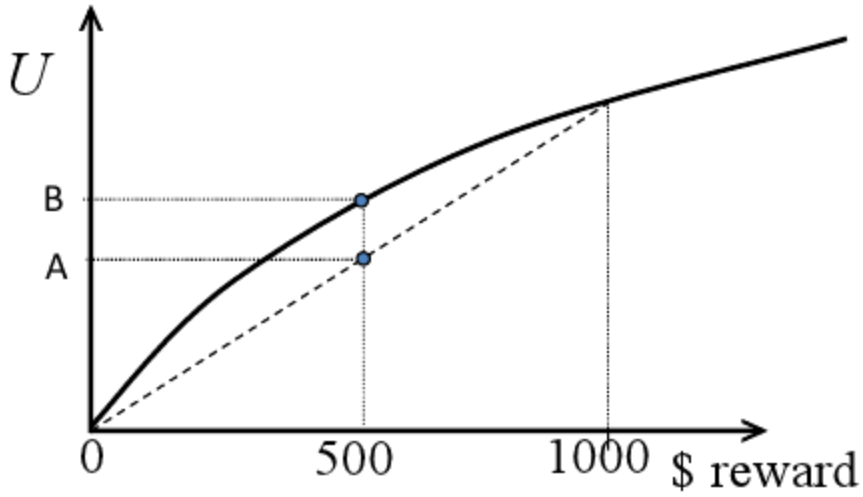


Your Answer		Score	Explanation
☑ $U(\ell)$ where ℓ is a lottery that pays \$0 with probability 0.5 and \$1000 with probability 0.5.	✔	0.25	Yes, this is correct, since the value of the lottery is equivalent to $0.5U(\$0) + 0.5U(\$1000)$.
☑ $0.5U(\$0) + 0.5U(\$1000)$	✔	0.25	This is correct, as you can observe from the geometry of the triangles in the figure.

☐ $500	✔	0.25	Think about what the plot is showing.
☐ $U(\$500)$	✔	0.25	A is not on the utility curve.
Total		1.00	

Question 2

Utility Curves. What does the point marked B on the Y axis correspond to? (Mark all that apply.)

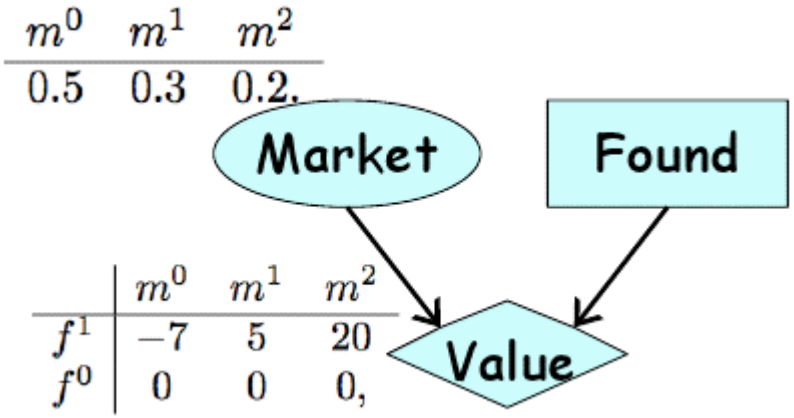


Your Answer		Score	Explanation
☐ $U(\ell)$ where ℓ is a lottery that pays \$0 with probability 0.5 and \$1000 with probability 0.5.	✔	0.25	Think about the fact that B lies on the curve.
☐ $0.5U(\$0) + 0.5U(\$1000)$	✔	0.25	Think about the fact that B lies on the curve.
☐ $\$500$	✔	0.25	Think about the fact that B lies on the curve.

☑ $U(\$500)$	✔	0.25	Yes, this is correct, since point B is on the curve, it represents $U(\$500)$.
Total		1.00	

Question 3

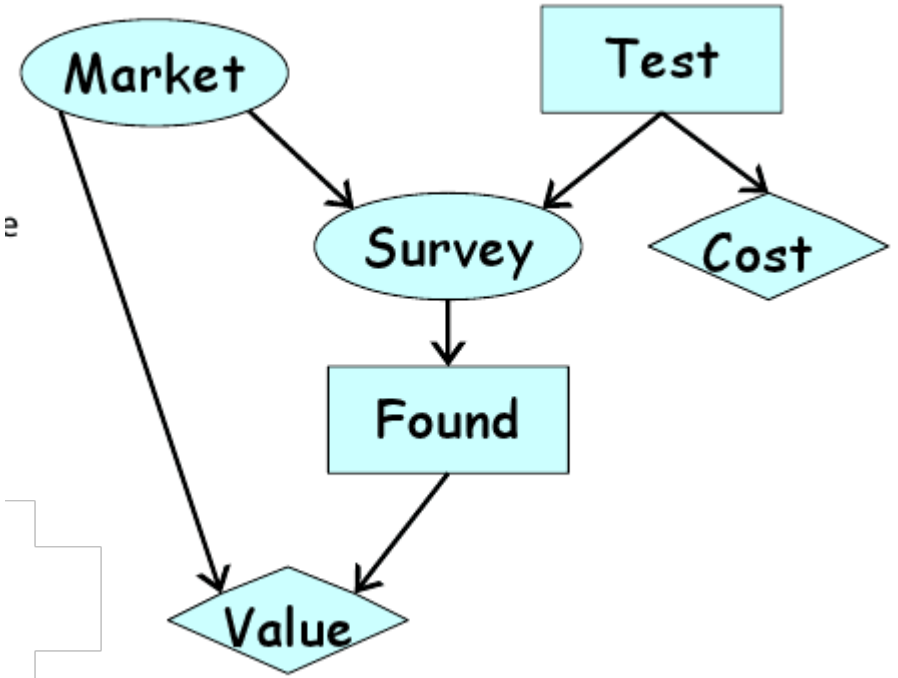
Expected Utility. In the simple influence diagram on the right, with the CPD for M and the utility function V, what is the expected utility of the action f^1?



Your Answer		Score	Explanation
◉ 2	✔	1.00	This is correct. The expected utility is given by 0.5*(-7) + 0.3*5 + 0.2*20 = 2.
Total		1.00	

Question 4

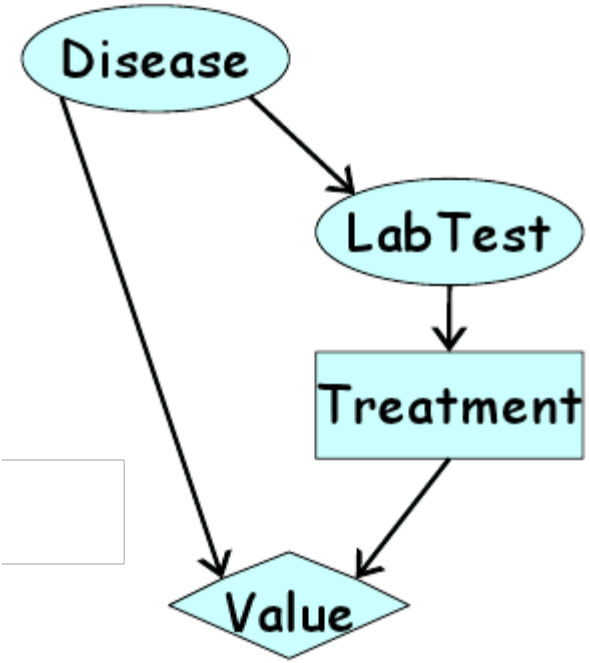
***Uninformative Variables.** In the influence diagram on the right, what is an appropriate way to have the model account for the fact that if the Test wasn't performed (t^0), then the survey is uninformative?



Your Answer	Score	Explanation
Set $P(S\|M,t^0)$ so that S takes some new value "not performed" with probability 1. ✔	1.00	This is the appropriate action. Assigning S to any other value would not be desirable, as these other values may represent survey results, but we have not actually conducted the survey.
Total	1.00	

Question 5

***Value of Information.** In the influence diagram on the right, when does performing LabTest have value? That is, when would you want to observe the LabTest variable?



Your Answer		Score	Explanation
When there is some lab value l such that $argmax_t \sum_d P(d\|l)V(d,t) \neq argmax_t \sum_d P(d)V(d,t)$	✔	1.00	This is correct. There is no value in information (observing LabTest) unless the information changes a decision (of Treatment in this case).
Total		1.00	