hw3_games_q11_preferences_and_utilities

Question 11: Preferences and Utilities

2/2 points (ungraded)

Our Pacman board now has food pellets of 3 different sizes - pellet P_1 of radius 1, P_2 of radius 2 and P_3 of radius 3. In different moods, Pacman has different preferences among these pellets. In each of the following questions, you are given Pacman's preference for the different pellets. From among the options pick the utility functions that are consistent with Pacman's preferences, where each utility function $U(r)$ is given as a function of the pellet radius r, and is defined over non-negative values of r.

$P_1 \sim P_2 \sim P_3$

- [x] $U(r) = 0$
- [x] $U(r) = 3$
- [ ] $U(r) = r$
- [ ] $U(r) = 2r + 4$
- [ ] $U(r) = -r$
- [ ] $U(r) = r^2$
- [ ] $U(r) = -r^2$
- [ ] $U(r) = \sqrt{r}$

- [ ] $U(r) = -\sqrt{r}$
- [ ] Irrational preferences!

✔

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problem

2/2 points (ungraded)

$P_1 \prec P_2 \prec P_3$

- [ ] $U(r) = 0$
- [ ] $U(r) = 3$
- [x] $U(r) = r$
- [x] $U(r) = 2r + 4$
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problem

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$(P_1 \prec P_2 \prec P_3)$ and $(P_2 \prec (\text{50-50 lottery among } P_1 \text{ and } P_3))$

- [ ] $U(r) = 0$
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$(P_1 \succ P_2 \succ P_3)$ and $(P_2 \succ (\text{50-50 lottery among } P_1 \text{ and } P_3))$

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- [ ] Irrational preferences!

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problem

2/2 points (ungraded)

$(P_1 \prec P_2)$ and $(P_2 \prec P_3)$ and
$((\text{50-50 lottery among } P_2 \text{ and } P_3) \prec (\text{50-50 lottery among } P_1 \text{ and } P_2))$

- [ ] $U(r) = 0$
- [ ] $U(r) = 3$
- [ ] $U(r) = r$
- [ ] $U(r) = 2r + 4$
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- [x] Irrational preferences!

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problem

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Which of the following would be a utility function for a risk-seeking preference? That is, for which utility(s) would Pacman prefer entering a lottery for a random food pellet, with expected size s, over receiving a pellet of size s?

- [ ] $U(r) = 0$

- [ ] $U(r) = 3$
- [ ] $U(r) = r$
- [ ] $U(r) = 2r + 4$
- [ ] $U(r) = -r$
- [x] $U(r) = r^2$
- [ ] $U(r) = -r^2$
- [ ] $U(r) = \sqrt{r}$
- [x] $U(r) = -\sqrt{r}$

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