1. Consider the lottery $\boldsymbol{q} = (25, \mathrm{p};\ 16,\ \mathrm{q}; 9, \mathrm{w})$, p+q+w=1. Assuming that the utility function is $\mathrm{u(x)} = \sqrt{\mathrm{x}}$ and the weighting function is $\pi(p) = p^2$.
   i. Using the Machina triangle (p on the vertical axis, w on the horizontal one) represent the following prospects: $\boldsymbol{q} = (25, \frac{1}{2};\ 9, \frac{1}{2})$, $\boldsymbol{r} = (25, \frac{8}{10};\ 16,\ \frac{1}{10}; 9, \frac{1}{10})$.
   ii. Check the sign of the slope of the indifference curves passing for ***q***
   iii. Check the sign of the slope of the indifference curves passing for ***r***

2. An individual prefers high outcomes respect to small ones.
   a. Suppose that lottery r stochastically dominates lottery q. Which is the preferred lottery?
   b. Check for stochastic dominance of the two following lotteries.
   $$q = (210, 0.30;\ 500, 0.2; 760, 0.5)$$
   $$r = (200, 0.30;\ 500, 0.15; 760, 0.55)$$

3. All Prospect theory's assumptions are satisfied. Assume that $\mathrm{v(x)} = \begin{cases} \sqrt{x}\ if\ x \geq 0 \\ -\frac{4}{5}\sqrt{-\mathrm{x}}\ if\ x < 0 \end{cases}$ and $\pi(\mathrm{p}) = \mathrm{p}^2$. Evaluate the following prospects and for each one compute the certainty equivalent (reference point 0):
   a. $(625, 0.60;\ -225, 0.40)$
   b. $(154, 0.15; 46, 0.55; 10, 0.30)$

4. Consider the following prospects $\boldsymbol{q} = (9,\ 0.12)$ and $\boldsymbol{r} = (27,\ 0.04)$. Assume that $v(x) = x$ and $\pi\left(\frac{1}{3} \cdot 0.12\right) > \frac{1}{3} \cdot \pi(0.12)$. State the preferred prospect.

5. Consider the following prospects $\boldsymbol{r} = (x)$, $\boldsymbol{q} = (y,\ 0.10; x,\ 0.89)$ $\boldsymbol{r}' = (x,\ 0.11)$ and $\boldsymbol{q}' = (y,\ 0.10)$, $x, y > 0$. Assume that ***q'*** is indifferent to ***r'*** and that $\pi(0.11) + \pi(0.89) < 1$. Which is the preferred lottery between ***r*** and ***q***? Prove your answer assuming a generic subjective value function $v(x)$.

6. All Prospect theory's assumptions are satisfied. Consider the following prospects: $\boldsymbol{q} = (x, 2p)$, $\boldsymbol{r} = (2x, p)$ where $x < 0$ and $p < 0.5$. Show that $q \succ r$ implies subadditivity.

7. Consider the following prospects $\boldsymbol{r} = (20, p)$, $\boldsymbol{q} = \left(24,\ \frac{2}{3}p\right)$ $\boldsymbol{r}' = (\boldsymbol{r},\ 0.5)$ and $\boldsymbol{q}' = (\boldsymbol{q},\ 0.5)$. Assume subcertainty and that ***q'*** is indifferent to ***r'***. Which is the preferred lottery between ***r*** and ***q***? Prove your answer assuming a generic subjective value function $v(x)$.

8. Assume $\pi(x) = x$ and that all other Prospect theory's assumptions are satisfied. Suppose the following two prospects: $\boldsymbol{q} = (-9,\ 0.12)$ and $\boldsymbol{r} = (-27,\ 0.04)$. Which is the preferred prospect when the reference point is 0? Which is the preferred prospect when the reference point is -27?

9. Check if $\pi(x) = x^2$ satisfies subadditivity, subproportionality and subcertainty.