Setup: Ted has income, but also a risk of heart attack.

Income $40,000 = I

Cost of Heart Attack treatment $30,000 = M

Probability Ted has Heart Attack 20% = p

Ted's utility function $U = \frac{1}{2}(I^{\frac{1}{2}})$

a) What is Ted's expected income (w/o insurance)?

2 states of world: no heart attack ① and heart attack ②

$E[I] = (1-p) \times$ Income w/o attack $+ p \times$ Income w/ attack

$E[I] = \$34,000$

b) What is Ted's expected utility (w/o insurance)?

$E[u] = (1-p) \times$ utility w/o attack $+ p \times$ utility w/ attack

$E[u] = (1-p) \, u(I = \$40,000) + p \times u(I = \$10,000)$

$E[u] = 90$ utils

c) What amount of income could Ted have with certainty that would make him equally happy as with the uncertainty in b)?

$E[u] =$ certain u

$90 = \frac{1}{2}(I^{\frac{1}{2}})$ 　　　$I = \$32,400$

Ted's Utility Problem

utility
(utils)

U healthy

U ($34,000)
w/ certainty

go = E[u]

Usick

u(I)

10,000
I sick

Income
w/ certainty
Ted would
accept
32,400

E[I]
34,000

40,000
I healthy   Income
                      ($)