Prof. Eckstein
Advanced Operations Mangmt
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# Homework 3 Solutions

**Q1**

$$R = 100 \frac{\text{computers}}{\text{day}} \cdot 360 \frac{\text{days}}{\text{year}} = 36{,}000 \frac{\text{computers}}{\text{year}}$$

$$D = 2000 \frac{\text{computers}}{\text{month}} \cdot 12 \frac{\text{months}}{\text{year}} = 24{,}000 \frac{\text{computers}}{\text{year}}$$

$$h = 300 \ \$/\text{computer} \cdot \text{year}$$

$$K = \$1000$$

$$q^* = \sqrt{\frac{2K}{h}} \sqrt{\frac{R}{R-D}} = \sqrt{\frac{2KDR}{h(R-D)}}$$

$$= \sqrt{\frac{2 \cdot 1000 \cdot 24000 \cdot 36000}{300\,(36000 - 24000)}}$$

$$\approx 693$$

$$\text{Runs/year} \approx \frac{24000}{693} \approx 34.6$$

Q2

$D = 500 \ \frac{\text{cars}}{\text{year}}$

$s = 20{,}000 \ \frac{\$}{\text{car} \cdot \text{year}}$

$h = (.25 \ /\text{year})(20000 \ \frac{\$}{\text{car}}) = 5000 \ \frac{\$}{\text{car year}}$

$K = \$10{,}000$

$$q^* = \sqrt{\frac{2kD(h+s)}{hs}}$$

$$= \sqrt{\frac{2 \cdot 10{,}000 \cdot 500 \cdot 25{,}000}{5000 \cdot 20{,}000}}$$

$$= \boxed{50 \text{ cars}} \quad \text{optimal order size}$$

$$M^* = \sqrt{\frac{2kDs}{h(h+s)}}$$

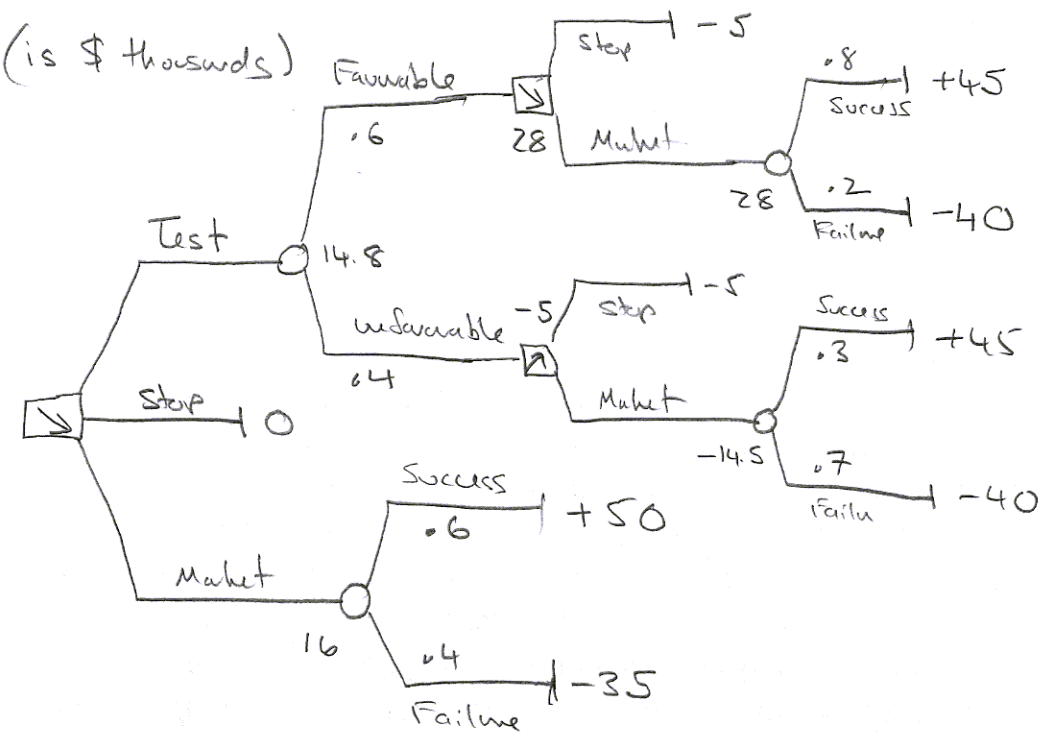
$$= \sqrt{\frac{2 \cdot 10000 \cdot 500 \cdot 20000}{5000 \cdot 25000}}$$

$$= 40 \text{ cars}$$

Therefore, the largest shortage is

$$q^* - M^* = 50 - 40 = \boxed{10 \text{ cars}}$$

Q3 (is $ thousands)



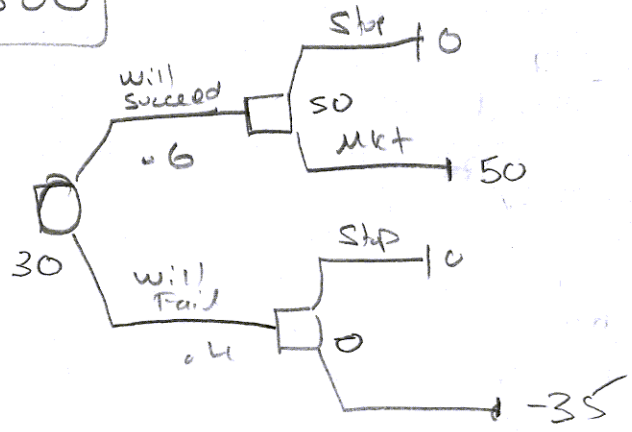

Strategy: just go straight to market

$$EVSI = (\text{Value w/ free test}) - (\text{Value with no test})$$

$$= (14{,}800 + 5000) - 16000$$

$$= \boxed{\$3800}$$

EVPI:

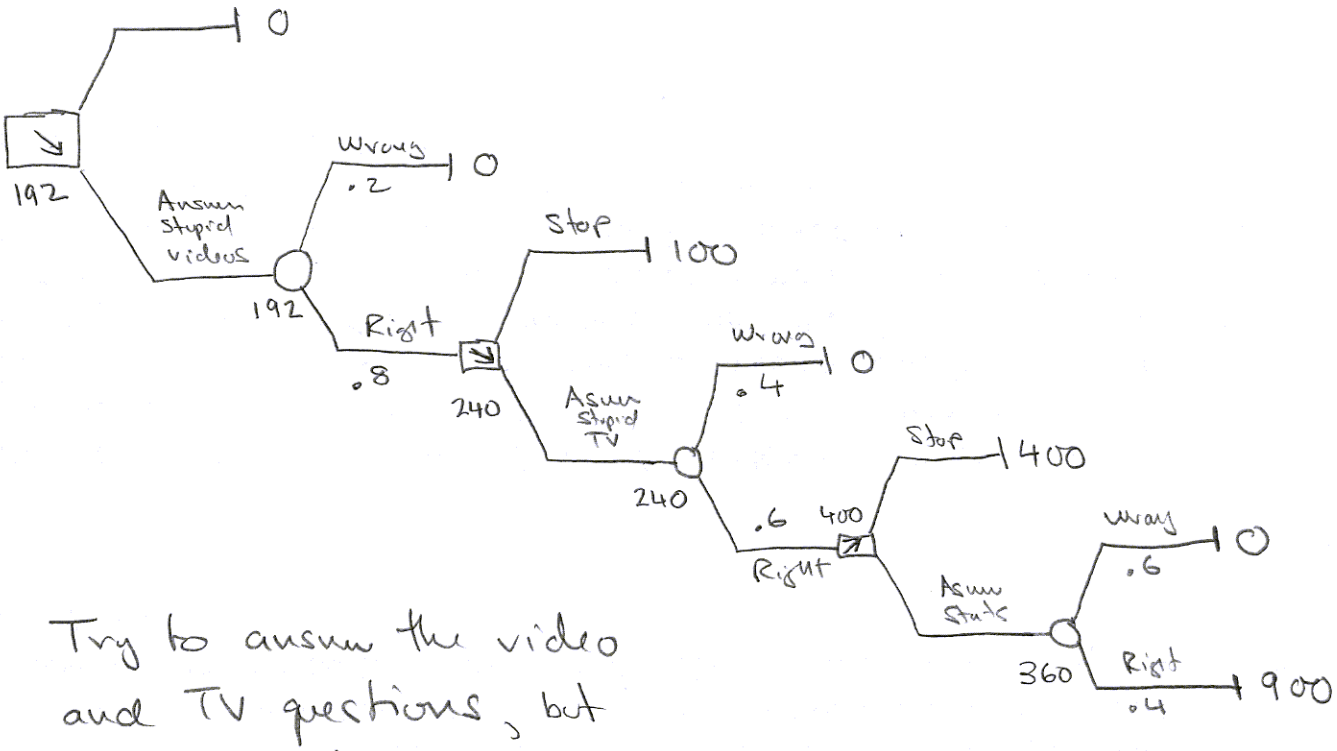



$$EVPI = 30000 - 14000$$

$$= \$16{,}000$$

Q4

This branch is optional! Wasn't clear from question, and makes no real difference




Try to answer the video and TV questions, but stop without answering statistics.

Expected "earnings" are $192.