

**ISE 307, Term 153**  
**ENGINEERING ECONOMIC ANALYSIS**

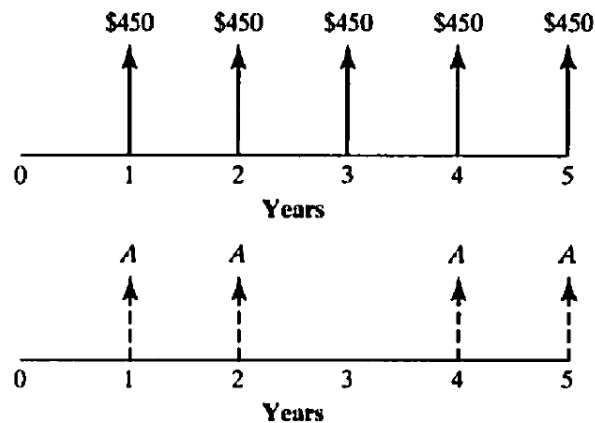
**Quiz# 1**

Date: Wednesday, July 20, 2016

**Q1.** Explain what makes economic decisions different from other design decisions?

Economic decisions involve predicting, or forecasting product sales, product selling price, and various costs over future time frame. Such forecasts are never completely accurate. A prediction or forecast made today is likely to be different than one made in future. Engineering design outcomes are often time invariant.

**Q2.** What value of A makes the two annual cash flows shown in the following diagram equivalent at 12% interest compounded annually?



$$450 (P/A, 12\%, 5) = A (P/A, 12\%, 5) - A (P/F, 12\%, 3)$$

$$450 * 3.6048 = A * 3.6048 - A * 0.7118$$

$$1622.16 = A (2.893)$$

$$A = 1622.16 / 2.893 = \$560.72$$

**Q3.** Matt Christopher is a 30-year-old mechanical engineer, and his salary next year will be \$80,000. Matt expects that his salary will increase at a steady rate of 6% per year until his retirement at age 60. If he saves 10% of his salary each year and invest these savings at an interest rate of 8%, how much will he have at his retirement?

$$A_1 = \$8000, g = 6\% = 0.06, \quad i = 8\% = 0.08, \quad N = 30 \text{ years}$$

$$F = \frac{A_1 \left[ 1 - (1+i)^{-N} (1+g)^N \right]}{i - g} [F/P, i\%, N] = \frac{8000 \left[ 1 - (1+0.08)^{-30} (1+0.06)^{30} \right]}{0.08 - 0.06} [F/P, 8\%, 30]$$

$$= 171690.9 * 10.0627 = \$1,727,673.69$$