(1) [7] A person has \$120,000 to invest and two investments are available. One pays 8% interest per year while the second only pays 5% per year. How should the \$120,000 be split between the two investments in order to earn a total of \$6900 in interest income over a one year period?

Let x = amount invested at 8%,
y = amount invested at 5%.

① $x + y = 120{,}000$

② $0.08x + 0.05y = 6900$

① $\Rightarrow$ $y = 120{,}000 - x$

② $\Rightarrow$ $0.08x + 0.05(120{,}000 - x) = 6900$

$0.08x + 6000 - 0.05x = 6900$

$0.03x = 900$

$x = 30000$

$\therefore$ $y = 120000 - 30000$

$= 90000$

$\therefore$ \$30 000 should be invested at 8%,
\$90 000 should be invested at 5%.

(2) [8] A manufacturer produces widgets at a cost of \$0.75 per unit and sells them for \$1 per unit. Determine the break-even point if daily operational overhead is \$300 .

Graph the revenue and cost lines and indicate the break-even point on your graph.

Let x = # units produced.

$C = 300 + 0.75x$

$R = 1 \cdot x$.

At break even $R = C$

$\Rightarrow x = 300 + 0.75x$

$0.25x = 300$

$x = \frac{300}{0.25} = 1200$

$\Rightarrow R = C = \$1200$.

$\therefore$ Break-even point is $(1200, 1200)$.