

*** SOLUTIONS ***

KING FAHD UNIVERSITY OF PETROLUUM & MINERALS

Math 131 - Term 041

Quiz #3

Section: 1 & 2

Name: _____

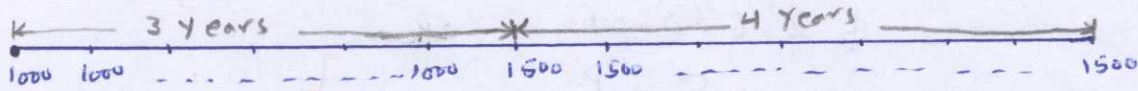
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Q1 (6 Points):

Given an interest rate of 8% compounded semiannually, find the present value of an annuity of \$1000 at the end of each six months for three years and \$ 1500 thereafter at the end of six months for four years.

$$r = \frac{.08}{2} = 0.04$$



$$\begin{aligned} \text{The present value of all payments} &= 1000(1.04)^{-1} + 1000(1.04)^{-2} + \dots + 1000(1.04)^{-6} \\ &\quad + 1500(1.04)^{-7} + 1500(1.04)^{-8} + \dots + 1500(1.04)^{-14} \\ &= 1500 a_{\overline{14}|0.04} - (1500 - 1000) a_{\overline{6}|0.04} \\ &\approx (1500)(10.563123) - (500)(5.242137) \\ &\approx 15,844.6845 - 2,621.0685 \\ &\approx \$ 13,223.62 \end{aligned}$$

6

Q2 (4 Points):

Find the dual (Do not solve.)

Maximize $Z = 2x_1 + x_2 - x_3$

Subject to $x_1 + x_2 \leq 1$

$x_1 - 2x_2 - x_3 \geq -2$

$x_1, x_2, x_3 \geq 0$

$\Rightarrow x_1 + x_2 \leq 1$

\Rightarrow change it to $-x_1 + 2x_1 + x_3 \leq 2$

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Minimize : $W = y_1 + 2y_2$

subject to : $y_1 - y_2 \geq 2$

$y_1 + 2y_2 \geq 1$

$y_2 \geq -1$

$y_1, y_2 \geq 0$

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