

EXAM FM QUESTIONS OF THE WEEK

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Week of September 3/07

Smith borrows \$100,000. The arrangement for repayment of Smith's loan are as follows:

- \$50,000 is amortized over 10 years with level annual payments at the end of each year at an annual effective rate of interest of 8%
- \$50,000 is repaid as a sinking fund repayment scheme, with the lender charging interest at an annual rate of 8% and with level sinking fund deposits at the end of each year for 10 years accumulating to \$50,000 and a sinking fund account annual effective interest rate of 6%.

Brown borrows \$100,000. The arrangement for repayment of Brown's loan are as follows:

- X is amortized over 10 years with level annual payments at the end of each year at an annual effective rate of interest of 8%
- $100,000 - X$ is repaid as a sinking fund repayment scheme, with the lender charging interest at an annual rate of 8% and with level sinking fund deposits at the end of each year for 10 years accumulating to $100,000 - X$ and a sinking fund account annual effective interest rate of 5.6%.

The total amount paid by Smith during the 10 years is the same as the total amount paid by Brown. Find X .

The solution can be found below.

Week of September 3/07 - Solution

Total amount paid by Smith over 10 years is

$$10 \times \left[\frac{50,000}{a_{\overline{10}|.08}} + 50,000(.08) + \frac{50,000}{s_{\overline{10}|.06}} \right] = 152,448.72 .$$

Total amount paid by Brown over 10 years is

$$10 \times \left[\frac{X}{a_{\overline{10}|.08}} + (100,000 - X)(.08) + \frac{100,000 - X}{s_{\overline{10}|.056}} \right] = 152,448.72 .$$

Solving this equation results in $X = 58,682$.