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| **Topic 1: Numbers and Algebra** |  | |
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| Maya wants to invest a portion of her paycheck for 15 years into an account paying 2.8% interest, compounded annually. She is expecting the annual inflation rate to be 1.8% per year throughout the 15-year period.  Maya is dreaming of a value of $10000 to her investment at the end of the 15-year period. The two options she is researching are below.  **Option 1:** Invest $2000 at the start of the 15-year period and invest $*m* into the account at the end of each year (including the first and last years).  **Option 2:** Make a one-time investment at the start of the 15-year period.  (a) For option 1, find the minimum value of *m* Maya would need to invest each year. Give your answer to the nearest dollar.  (b) For option 2, determine the minimum amount Maya would need to invest. Give your answer to the nearest dollar. | | [3 marks]  [3 marks] |
| Mark scheme:  (a) First find the FV of the $10000 desired after 15 years with an annual  inflation rate of 1.8%:  N = 15  I = 1.8%  PV = 10000  **FV = -13068.227…**  P/Y = 1  C/Y = 1  Then find the monthly payment with this new FV:  N = 15  I = 2.8%  PV = -2000  FV = 13068.227…  P/Y = 1  C/Y = 1  **PMT = $547.8767… ≈ $548**  (b) Using FV = 10000 and a rate of 2.8% - 1.8% = 1%  N = 15  I = 1  FV = 10000  P/Y = 1  C/Y = 1  **PV = $8613.4947… ≈ $8613** | | (M1)  (A1)    A1  [3 marks]  (A1)  (M1)  A1  [3 marks] |
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