Question #29
Answer: B

$d = 0.05 \Rightarrow v = 0.95$

Step 1 Determine p_x from Kevin's work:

$$608 + 350 v p_x = 1000 v q_x + 1000 v^2 p_x \left(p_{x+1} + q_{x+1} \right)$$
$$608 + 350(0.95) p_x = 1000(0.95)(1 - p_x) + 1000(0.9025) p_x (1)$$
$$608 + 332.5 p_x = 950(1 - p_x) + 902.5 p_x$$
$$p_x = 342/380 = 0.9$$

Step 2 Calculate $1000 P_{x:\overline{2}|}$, as Kira did:

$$608 + 350(0.95)(0.9) = 1000 P_{x:\overline{2}|} \left[1 + (0.95)(0.9) \right]$$
$$1000 P_{x:\overline{2}|} = \frac{[299.25 + 608]}{1.855} = 489.08$$

The first line of Kira's solution is that the expected present value of Kevin's benefit premiums is equal to the expected present value of Kira's, since each must equal the expected present value of benefits. The expected present value of benefits would also have been easy to calculate as

$(1000)(0.95)(0.1) + (1000)\left(0.95^2\right)(0.9) = 907.25$

Question #30
Answer: E

Because no premiums are paid after year 10 for (*x*), ${}_{11}V_x = A_{x+11}$

One of the recursive reserve formulas is ${}_{h+1}V = \dfrac{\left({}_hV + \pi_h\right)(1+i) - b_{h+1} q_{x+h}}{p_{x+h}}$

$${}_{10}V = \frac{(32{,}535 + 2{,}078) \times (1.05) - 100{,}000 \times 0.011}{0.989} = 35{,}635.642$$
$${}_{11}V = \frac{(35{,}635.642 + 0) \times (1.05) - 100{,}000 \times 0.012}{0.988} = 36{,}657.31 = A_{x+11}$$