Exercise 7.7

The loss due to mortality is given by

$$(100\, q_{65}-1)\times(100000+200-\,_6V) = (100(0.005914652)-1)\times(100000+200-35324) = -26504.1$$

Here note that we have used as many decimal places (computed separately) for q_{65} rather than the value 0.0059 published in the text because rounding will not exactly match the results. The expected interest earned for the year is

$$100 \times 0.05 \times (\,_5V + 0.95 \times P) = 100 \times 0.05 \times (29068 + 0.95 \times 5200) = 170040.$$

The actual interest earned is

$$100 \times 0.065 \times (\,_5V + 0.95 \times P) = 100 \times 0.065 \times (29068 + 0.95 \times 5200) = 221052$$

so that the difference gives the gain due to interest:

$$221052 - 170040 = 51012.$$

The expected expenses for the year are

$$100 \times 0.05 \times P \times 1.065 + 200 = 27890$$

and the corresponding actual expenses are

$$100 \times 0.06 \times P \times 1.065 + 250 = 33478.$$

The loss due to higher than expected expenses is therefore

$$27890 - 33478 = -5588.$$

Thus, we see that the total gain for the year consists of the sum of these three components:

$$-26504.1 + 51012 - 5588 = 18919.9.$$

(Slight rounding may have resulted from the rounding of the policy values.)