1. First we have \( l^{(r)}_{60} = 1000 \). Using the absolute rates of decrement, we find the number of survivors to age 61:

\[
l^{(r)}_{61} = 1000(1 - 0.01)(1 - 0.03)(1 - 0.1) = 864.27
\]

Under the uniform distribution assumption in the associated single decrements, the probabilities can be obtained as follows:

\[
q^{(1)}_{60} = 0.01 \int_0^1 (1 - 0.03t)(1 - 0.1t)dt = 0.00936
\]

\[
q^{(1)}_{61} = 0.013 \int_0^1 (1 - 0.05t)(1 - 0.2t)dt = 0.01142
\]

Thus the number of deaths before age 62 is

\[
\therefore d^{(1)}_{60} + d^{(1)}_{61} = 1000 \cdot 0.00936 + 864.27 \cdot 0.01142 = 19.2285
\]

2. Since retirements occur at the beginning of the year of age 60, \( q^{(3)}_{60} = q^{(3)}_{60} = 0.1 \) (\( ^\star \)). Also this can be verified in the following way. First let us define

\[
tp^{(r)}_{60} = (1 - 0.01t)(1 - 0.03t)(1 - 0.1), \quad 0 < t \leq 1
\]

Under the uniform distribution assumption in the associated single decrements (1) and (2), we find the probabilities

\[
q^{(1)}_{60} = 0.01(1 - 0.1) \int_0^1 (1 - 0.03t)dt = 0.008865
\]

\[
q^{(2)}_{60} = 0.03(1 - 0.1) \int_0^1 (1 - 0.01t)dt = 0.026865
\]

Therefore, we obtain the same result as in (\( ^\star \))

\[
q^{(3)}_{60} = q^{(r)}_{60} - (q^{(1)}_{60} + q^{(2)}_{60}) = (1 - p^{(r)}_{60}) - (q^{(1)}_{60} + q^{(2)}_{60})
\]

\[
= 1 - (1 - 0.01)(1 - 0.03)(1 - 0.1) - (0.008865 + 0.026865)
\]

\[
= 0.1
\]