生命保険数学 問題6

1. 次の $\Big[\quad\Big]$ に当てはまる適切な式、記号又は数値を書け。

(1) $\quad {_{t|}}q_{xy} = {_t}p_{xy} - \Big[\qquad\Big]$

(2) $\quad {_t}q_{\overline{xy}} = \big(\big[\quad\big] - {_t}p_x\big)\big(\big[\quad\big] - {_t}p_y\big)$

(3) $\quad {_{t|}}q_{\overline{xy}} = {_{t|}}q_x + {_{t|}}q_y - \Big[\qquad\Big]$

(4) $\quad {_t}p_{\overline{xy}}^{[1]} = {_t}p_x + {_t}p_y - \Big[\qquad\Big]$

(5) $\quad \dfrac{d\,{_t}p_{xy}}{dt} = -\Big[\qquad\Big]$

(6) $\quad {_t}p_{\overline{xy}} \cdot \mu_{\overline{x+t,y+t}} = {_t}q_y\, {_t}p_x\, \mu_{x+t} + \Big[\qquad\Big]$

(7) $\quad {_{t|}}q_{xyz}^{1} = \displaystyle\int_t^{t+1} {_s}p_{xyz} \Big[\qquad\Big]\, ds$

(8) $\quad {_{t|}}q_{xy}^{2} = \displaystyle\int_t^{t+1} \Big[\qquad\Big]\, {_s}p_x\, \mu_{x+s}\, ds$

(9) $\quad {_t}q_{xy}^{2} = \displaystyle\int_0^{t} {_s}p_{xy}\, \mu_{y+s} \Big[\qquad\Big]\, ds$

(10) $\quad {_t}q_{xy}^{1} = {_t}q_x - \Big[\qquad\Big]$

(11) $\quad {_t}q_{xy}^{1} - {_t}q_{x\overset{2}{y}} = {_t}p_y \Big[\qquad\Big]$

(12) $\quad {_{t|}}q_{xy}^{2} = {_{t|}}q_{x\overset{1}{y}} + {_t}p_x\, {_t}q_y - \Big[\qquad\Big]$

(13) $\quad {_{t|}}q_{\overset{2}{x}\overset{1}{y}z} = {_{t|}}q_{\overset{1}{y}z} - \Big[\qquad\Big]$

(14) $\quad \Big[\qquad\Big] = {_t}q_{\overset{2}{x}\overset{1}{y}z} - {_t}q_{x\overset{2}{y}}\, {_t}p_z$

(15) $\quad {_{t|}}q_{\overset{2:3}{x}\overset{1}{y}z} = {_{t|}}q_{\overset{2}{x}\overset{1}{y}z} + \Big[\qquad\Big]$

(16) $\quad {_t}p_{\overline{xyz}}^{\,2} = {_t}p_{xy} + {_t}p_{yz} + {_t}p_{xz} - \Big[\qquad\Big]$

(17) $\quad {_t}q_{\overset{3}{x}\,\overset{2}{y}\,\overset{1}{z}\,w} = \displaystyle\int_0^{t} \Big[\qquad\Big]\, {_s}p_{xy}\, \mu_{x+s}\, ds$

(18) $\quad {_{t|}}q_{\big[\qquad\big]} = \displaystyle\int_t^{t+1} {_s}p_{xy}\, {_s}p_z\, \mu_{x+s,y+s}\, ds$

2. 死力 μ_x が $\mu_x = \dfrac{1}{100-x}$ $(0 \le x < 100)$ で与えられるとき、次の値を求めよ。

(19) $\quad {_{20}}q_{20,40}^{1}$

(20) $\quad {_{20}}q_{20,\overset{2}{40},\overset{1}{60}}$

(21) $\quad \overset{\circ}{e}_{20,40}$

(22) $\quad \overset{\circ}{e}_{\overline{20,40}}$

3. 死亡法則がゴムパーツの法則 $\mu_x = Bc^x$ に従うとする。次の $\Big[\quad\Big]$ に当てはまる適切な c^x, c^y, c^z の式を記入せよ。

(23) $\quad {_t}q_{xyz}^{1} = \Big[\qquad\Big]\, {_t}q_{xyz}$

(24) $\quad {_t}q_{\overset{2}{x}\overset{1}{y}z} = \Big[\qquad\Big]\, {_t}q_{yz} - \Big[\qquad\Big]\, {_t}q_{xyz}$

(25) $\quad {_{\infty}}q_{xyz}^{2} = \Big[\qquad\Big]$