

Primas Netas Únicas de Seguros de Vida

1. Pago al momento de fallecimiento

1.1 Los seguros

1.1.1. Ordinario de vida

$$\bar{A}_x = \int_0^\infty v^t p_x \mu_{x+t} dt$$

1.1.2. Temporal

$$\bar{A}_{x:\overline{n}|}^1 = \int_0^n v^t p_x \mu_{x+t} dt$$

1.1.3. Dotal mixto

$$\bar{A}_{x:\overline{n}|} = \bar{A}_{x:\overline{n}|}^1 + A_{x:\overline{n}|}^{} = \int_0^n v^t p_x \mu_{x+t} dt + v^n {}_n p_x$$

1.1.4. Diferido

$${}_m|\bar{A}_x = \int_m^\infty v^t {}_m p_x \mu_{x+t} dt$$

1.1.5. Incremental Anual

$$({}^I\bar{A})_x = \int_0^\infty [t+1] v^t p_x \mu_{x+t} dt$$

1.1.6. Incremental Continuo

$$({}^{\bar{I}}\bar{A})_x = \int_0^\infty t v^t {}_t p_x \mu_{x+t} dt$$

1.1.7. Incremental Fraccionario

$$({}^{(m)}\bar{A})_x = \int_0^\infty \frac{[tm+1]}{m} v^t {}_t p_x \mu_{x+t} dt$$

1.1.8. Decremental Anual

$$({}^D\bar{A})_{x:\overline{n}|}^1 = \int_0^n v^t (n-[t]) {}_t p_x \mu_{x+t} dt$$

1.2 Conmutados

$$\bar{C}_x = \int_0^1 v^{x+t} l_{x+t} \mu_{x+t} dt = \int_0^1 D_{x+t} \mu_{x+t} dt$$

$$\bar{M}_x = \sum_{t=0}^\infty \bar{C}_{x+t} = \int_0^\infty D_{x+t} \mu_{x+t} dt$$

$$\bar{R}_x = \sum_{t=0}^\infty \bar{M}_{x+t}$$

$$\bar{D}_x = \int_0^1 D_{x+t} dt$$

$$\bar{N}_x = \sum_{t=0}^\infty \bar{D}_{x+t}$$

$$\bar{S}_x = \sum_{t=0}^\infty \bar{N}_{x+t}$$

1.3 Seguros con conmutados

1.3.1. Ordinario de vida

$$\bar{A}_x = \frac{\bar{M}_x}{D_x}$$

1.3.2. Temporal

$$\bar{A}_{x:\overline{n}|}^1 = \frac{\bar{M}_{x+n} - \bar{M}_x}{D_x}$$

1.3.3. Dotal mixto

$$\bar{A}_{x:\overline{n}|} = \frac{\bar{M}_x - \bar{M}_{x+n} + D_{x+n}}{D_x}$$

1.3.4. Diferido

$${}_m|\bar{A}_x = \frac{\bar{M}_{x+n}}{D_x}$$

1.3.5. Incremental Anual

$$({}^I\bar{A})_x = \frac{\bar{R}_x}{D_x}$$

1.3.6. Incremental Continuo

$$({}^{\bar{I}}\bar{A})_x = \frac{\bar{R}_x - \frac{1}{2}\bar{M}_x}{D_x}$$

1.3.7. Incremental Fraccionario

$$({}^{(m)}\bar{A})_x = \frac{\bar{R}_x - \frac{m-1}{2m}\bar{M}_x}{D_x}$$

1.3.8. Decremental Anual

$$({}^D\bar{A})_{x:\overline{n}|}^1 = \frac{n\bar{M} - (\bar{R}_{x+1} - \bar{R}_{x+n+1})}{D_x}$$

2. Pago al final del año de fallecimiento

2.1 Los seguros

2.1.1. Ordinario de vida

$$A_x = \sum_{k=0}^\infty v^{k+1} {}_k p_x q_{x+k}$$

2.1.2. Temporal

$$A_{x:\overline{n}|}^1 = \sum_{k=0}^{n-1} v^{k+1} {}_k p_x q_{x+k}$$

2.1.3. Dotal puro

$$A_{x:\overline{n}|}^{} = v^n {}_n p_x$$

2.1.4. Dotal mixto

$$A_{x:\overline{n}|} = \sum_{k=0}^{n-1} v^{k+1} {}_k p_x q_{x+k} + v^n {}_n p_x$$

2.1.5. Diferido

$${}_m|A_x = \sum_{k=0}^\infty v^{k+1} {}_k p_x q_{x+k}$$

2.1.6. Incremental

$$({}^IA)_x = \sum_{k=0}^\infty (k+1) v^{k+1} {}_k p_x q_{x+k}$$

2.1.7. Incremental Temporal

$$({}^IA)_{x:\overline{n}|}^1 = \sum_{k=0}^{n-1} (k+1) v^{k+1} {}_k p_x q_{x+k}$$

2.1.8. Ordinario de vida incremental por n años

$$({}^I{}_n|A)_x = ({}^IA)_{x:\overline{n}|}^1 + n({}_n|A)_x$$

2.1.9. Decremental

$$({}^DA)_{x:\overline{n}|}^1 = \sum_{k=0}^{n-1} (n-k) v^{k+1} {}_k p_x q_{x+k}$$

2.2 Conmutados

$$C_x = v^{x+1} d_x$$

$$M_x = \sum_{t=0}^\infty C_{x+t}$$

$$R_x = \sum_{t=0}^\infty M_{x+t}$$

$$D_x = v^x l_x$$

$$N_x = \sum_{t=0}^\infty D_{x+t}$$

$$S_x = \sum_{t=0}^\infty N_{x+t}$$

2.3 Seguros con conmutados

2.3.1. Ordinario de vida

$$A_x = \frac{M_x}{D_x}$$

2.3.2. Temporal

$$A_{x:\overline{n}|}^1 = \frac{M_x - M_{x+n}}{D_x}$$

2.3.3. Dotal puro

$$A_{x:\overline{n}|}^{} = \frac{D_{x+n}}{D_x}$$

2.3.4. Dotal mixto

$$A_{x:\overline{n}|} = \frac{M_x - M_{x+n} + D_{x+n}}{D_x}$$

2.3.5. Diferido

$${}_m|A_x = \frac{M_{x+n}}{D_x}$$

2.3.6. Incremental

$$({}^IA)_x = \frac{R_x}{D_x}$$

2.3.7. Incremental Temporal

$$({}^IA)_{x:\overline{n}|}^1 = \frac{R_x - R_{x+n} - nM_{x+n}}{D_x}$$

2.3.8. Ordinario de vida incremental por n años

$$({}^I{}_n|A)_x = \frac{R_x - R_{x+n}}{D_x}$$

2.3.9. Decremental

$$({}^DA)_{x:\overline{n}|}^1 = \frac{nM_x - (R_{x+1} - R_{x+n+1})}{D_x}$$

3. Supuesto de Distribución de Muertes Uniforme

3.1 Ordinario

$$\bar{A}_x \simeq \frac{i}{\delta} A_x$$

3.2 Ordinario Fraccionario

$$A_x^{(m)} = \frac{i}{i^{(m)}} A_x$$

3.3 Temporal

$$\bar{A}_{x:\overline{n}|}^1 \simeq \frac{i}{\delta} A_{x:\overline{n}|}^1$$

3.4 Dotal Mixto

$$\bar{A}_{x:\overline{n}|} \simeq \frac{i}{\delta} A_{x:\overline{n}|}^1 + nE_x = \frac{i}{\delta} A_{x:\overline{n}|}^1 + A_{x:\overline{n}|}^{}$$

3.5 Incremental Anual

$$({}^I\bar{A})_{x:\overline{n}|} = \frac{i}{\delta} ({}^IA)_{x:\overline{n}|}^1$$

3.6 Incremental Continuo

$$({}^{\bar{I}}\bar{A})_n = \frac{i}{\delta} \left[({}^IA)_x - \left(\frac{1}{d} - \frac{1}{\delta} \right) A_x \right]$$

4. Relaciones entre Seguros y Anualidades

$$1 = \delta \bar{a}_x + \bar{A}_x$$

$$1 = \delta \bar{a}_{x:\overline{n}|} + \bar{A}_{x:\overline{n}|}$$

$$1 = d \ddot{a}_x + A_x$$

$$A_x = v \ddot{a}_x - a_x$$

$$1 = d \ddot{a}_{x:\overline{n}|} + A_{x:\overline{n}|}$$

$$\ddot{a}_{x:\overline{n}|} = 1 + a_{x:\overline{n-1}|}$$

$$A_{x:\overline{n}|}^1 = v \ddot{a}_{x:\overline{n}|} - a_{x:\overline{n}|}$$

$$A_{x:\overline{n}|} = v \ddot{a}_{x:\overline{n}|} - a_{x:\overline{n-1}|}$$

$$\ddot{a}_{x:\overline{n}|} = \ddot{a}_{\overline{n}|} + \ddot{a}_x - \ddot{a}_{x:\overline{n}|}$$