Question #116
Key: C

Expected claims under current distribution = 500

$\theta =$ parameter of new distribution

$X =$ claims

$\mathrm{E}(X) = \theta$

$\text{bonus} = .5 \times [500 - X \wedge 500]$

$$\text{E (claims + bonus)} = \theta + .5\left(500 - \theta\left(1 - \frac{\theta}{500+\theta}\right)\right) = 500$$

$$\theta - \frac{\theta}{2}\left(\frac{500}{500+\theta}\right) = 250$$

$$2(500+\theta)\theta - 500\theta = 250(500+\theta)\cdot 2$$

$$1000\theta + \theta^2 \cdot 2 - 500\theta = 2 \times 250 \times 500 + 500\theta$$

$$\theta = \sqrt{250 \times 500} = 354$$