① $E(10K_1\hat{\theta}_1 + 10K_2\hat{\theta}_2) = \theta$ U.E. def.

$E(10K_1\hat{\theta}_1) + E(10K_2\hat{\theta}_2) = \theta$

$10K_1 \cdot E(\hat{\theta}_1) + 10K_2 \cdot E(\hat{\theta}_2) = \theta$ } properties of expected value

$10K_1\theta + 10K_2\theta = \theta$ $E(\hat{\theta}) = \theta$ since we are given $\hat{\theta}$ is UE of θ

$10K_1 + 10K_2 = 1$

$K_1 + K_2 = 1/10$ solution

② $n = 322$ is even $\Rightarrow$ $M = \frac{1}{2}\left(X_{(\frac{n}{2})} + X_{(\frac{n}{2}+1)}\right)$

$M = \frac{1}{2}\left(X_{(\frac{322}{2})} + X_{(\frac{322}{2}+1)}\right)$

$M = \frac{1}{2}\left(X_{(161)} + X_{(162)}\right)$

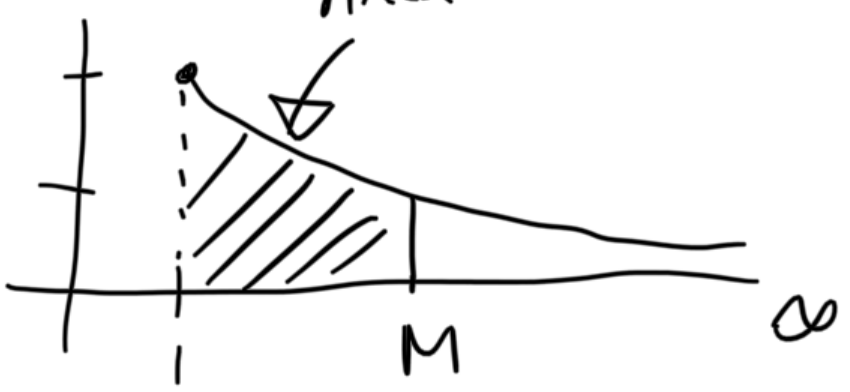
④ $\int_1^M \frac{2}{x^3}\,dx = 0.5 \Rightarrow -\frac{1}{x^2}\Big|_1^M = 0.5$

$-\frac{1}{M^2} - (-1) = 0.5$

$\frac{1}{M^2} = 0.5$

$M = \sqrt{2} \approx 1.41$

positive only because domain is $[1, \infty)$

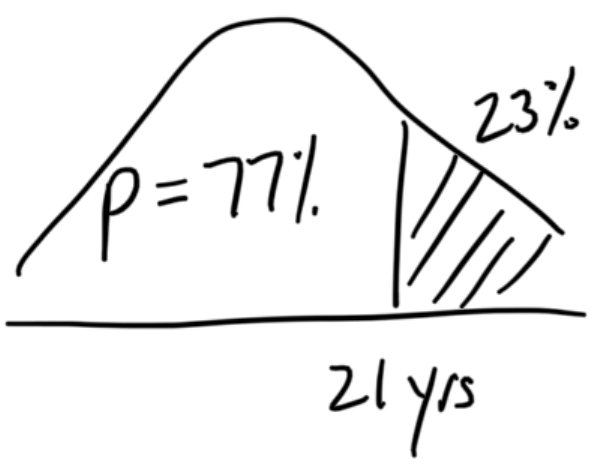


⑨ $E(\hat{\beta}) = \frac{n+1}{n}\beta$ solve for β

$E\left(\frac{n}{n+1}\hat{\beta}\right) = \beta$

U.E.

⑦



(17) $IQR = Q_3 - Q_1 = 71 - 66 = 5$

Extreme

below $66 - 3(5) = 51$ None since the min = 52

above $71 + 3(5) = 86$ 87, 90