Assignment on Central Limit Theorem

① $\mu = 10, \sigma = 4, n = 160$

$$z = \frac{9-10}{\frac{4}{\sqrt{100}}} = -2.5$$

$$= \boxed{0.0062}$$

④ $\mu = 96, \sigma = 16, n = 35$

$$z = \frac{98-96}{\frac{16}{\sqrt{35}}} = 0.739$$

$$= 0.7673$$

$$1 - 0.7673$$

$$= 0.2327$$

⑤ $\mu = 6, \sigma = 1$

a) $P(<6.2) = \frac{6.2-6}{\frac{1}{\sqrt{1}}}$

$= 0.2$

$= 0.5793$

b) $\because Z = \frac{6.2-6}{\frac{1}{\sqrt{100}}} = 2$

$= 0.9772$

⑥ In 5b, it is 100 randomly selected men. There is no Guarantee that the next 100 members who will buy the helmet will have head breadths less than 6.2 inch. Hence, the probability of 97% in previous Problem may turn out to be inaccurate in this case.

⑦ $\mu = 268, \sigma = 15, n = 25$

$$z = \frac{260-268}{\frac{15}{\sqrt{25}}}$$

$$= \frac{-8}{\frac{15}{5}} = \frac{-8}{3} = -2.666$$

$$= \boxed{0.0039}$$

⑨ a) $\mu = 172, \sigma = 29$

$$P(>190) = \frac{190-172}{\frac{29}{\sqrt{1}}}$$

$= 0.620$

$= 1 - 0.7324$

$= \boxed{0.2676}$

b) $n = 25$

$$P(>190) = \frac{190 - 172}{\frac{29}{\sqrt{25}}}$$

$$= 18 \times \frac{5}{29}$$

$$= 3.103$$

$$= \boxed{0.9990}$$

c) max = 4750

$n = 25$

$\mu = 4300$

$\sigma = 725$

$$z > \frac{4750 - 4300}{\frac{725}{\sqrt{25}}}$$

$$= 3.103 \text{ ≈ } \$$$

$$= 0.9990$$

∴ Prob. that will be over the maximum allowable weight is 0.9993.

$$1 - 0.9990$$

$$= \boxed{0.001}$$

(2) $x = 550$

$\mu = 50$

$\sigma = 15$

For 10 students

$\mu = 500$

$\sigma = 150$

$$Z = \frac{550 - 500}{\frac{150}{\sqrt{10}}}$$

$= 1.054$

$= \boxed{0.8531}$

(3) $\mu_p = 2.4$

$\sigma_p = 2.0$

$100 \times Z = 250$

$= 2.5$

$= 0.9938$

(9) $\mu = 4$

(10) $\sigma = 1.5$

$n = 50$

$$Z = \frac{3.5 - 4}{\frac{1.5}{\sqrt{50}}} \quad \& \quad \frac{3.8 - 4}{\frac{1.5}{\sqrt{50}}}$$

$= -2.357$ $= -0.9428$

$= 0.0094$ $= 0.1736$

$\Rightarrow 1 - 0.0094$ $\Rightarrow 1 - 0.1736$

$= 0.9906$ $= 0.8624$

b/w 3.5 & 3.8 $= 0.9906 - 0.8624$

$= \boxed{0.1282}$ $= 0.183$

(11) $\mu = 23.1$

$\sigma = 3.1$

$$P(>27) = \frac{27 - 23.1}{\frac{3.1}{\sqrt{6}}}$$

$= 3.081$

$= 0.9990$

$\Rightarrow 1 - 0.9990$

$= \boxed{0.001}$

(12) $\mu = 21.50$

$n = 8$

$\sigma = 2.022$

$P(20 \text{ \& } 23)$

$$Z = \frac{20 - 21.50}{\frac{2.022}{\sqrt{8}}} \quad \& \quad \frac{23 - 21.50}{\frac{2.022}{\sqrt{8}}}$$

$= -1.911$ $= 1.911$

$= 0.0281$ $= 0.9719$

$\Rightarrow 1 - 0.0281$ $\Rightarrow 1 - 0.9719$

$= 0.9719$ $= 0.0281$

b/w 20 & 23

0.9719

-0.0281

$\boxed{0.9438}$

$0.1736 + 0.0094$

$= 0.183$

(13) $\mu = 75$

$\sigma = 5$

a) $P(\text{atleast } 83)$

$= \frac{83-75}{\frac{5}{\sqrt{1}}}$

$= 1.6$

$= 0.9452$

$\Rightarrow 1 - 0.9452$

$= \boxed{0.0548}$

(14) $\mu = 28.3$

$\sigma = 2.3$

$Z = \frac{27-28.3}{\frac{2.3}{\sqrt{10}}}$

$= -1.787$

$= \boxed{0.0375}$

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18) what do u mean by suits equally