

38

$$\text{median} = 111$$

$$\frac{110+x}{2} = 111$$

$$110+x = 222$$

$$x = 112$$

$$\text{range} = 19$$

$$z - 102 = 19$$

$$z = 121$$

$$\text{mean} = 110.5$$

$$\frac{102 + 105 + 110 + 112 + y + 121}{6} = 110.5$$

$$102 + 105 + 110 + 112 + y + 121 = 663$$

$$y = 113$$

39) a) The standard deviation is multiplied by 10.

b) The standard deviation does not change.

40)

$$52.5 = \mu + k\sigma$$

$$52.5 = 30 + k(5)$$

$$22.5 = k(5)$$

$$4.5 = k$$

$$1 - \frac{1}{4.5^2} \approx 0.95$$

At least 95% of measurements fall between 7.5 and 52.5

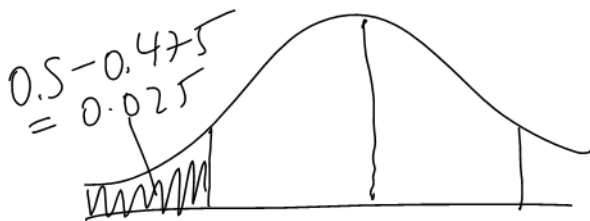
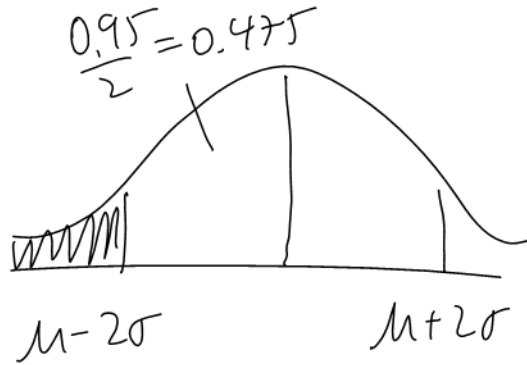
41

$$\mu - k\sigma = 58$$

$$70 - k(6) = 58$$

$$-k(6) = -12$$

$$k = 2$$



Approximately 0.025 or 2.5%

42

Math

$$\begin{aligned} z &= \frac{x - \mu}{\sigma} \\ &= \frac{60 - 70}{5} \\ &= -2 \end{aligned}$$

Physics

$$\begin{aligned} z &= \frac{x - \mu}{\sigma} \\ &= \frac{66 - 72}{2} \\ &= -3 \end{aligned}$$

The student did better in math.
(z-score in math is less negative).

- (43)
- a) 1-in-10 systematic random sample
 - b) cluster sample
 - c) simple random sample
 - d) stratified random sample

- (44)
- a) observational
 - b) experimental

(45) The problem is that the sample is nonrepresentative.

(Math 156 students are not representative of all Camden students.)

$$(46) \text{ a) } 26 + 26 = 52 \text{ symbols}$$

$$52^4 = 7,311,616$$

$$\text{b) } \# \text{ with no upper-case letters} = 26^4$$

$$\# \text{ with at least 1 upper-case letter}$$
$$= \text{total } \# - \# \text{ with no upper-case letters}$$

$$= 52^4 - 26^4$$

$$= 6,854,640$$

$$(47) \text{ a) } \underline{1} \times \underline{1} \times \underline{10} \times \underline{10} = 100$$

$$\text{b) } \underline{10} \times \underline{10} \times \underline{10} \times \underline{1} = 1000$$

$$\text{c) } \underline{1} \times \underline{1} \times \underline{10} \times \underline{1} = 10$$

$$\text{d) } n(A \text{ or } B) = n(A) + n(B) - n(A \text{ and } B)$$

$$n(\text{start with 21 or end with 7})$$

$$= n(\text{start with 21}) + n(\text{end with 7})$$
$$- n(\text{start with 21 and end with 7})$$

$$= 100 + 1000 - 10$$

$$= 1090$$

48

$$P(E) = \frac{n(E)}{n_{\text{total}}}$$

$$n_{\text{total}} = 41 + 32 + 119 + 8 \\ = 200$$

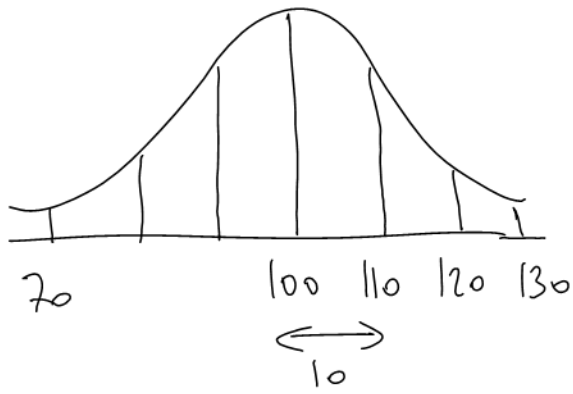
$$a) \frac{41 + 119}{200} = 0.8$$

$$b) \frac{119 + 8}{200} = 0.635$$

$$c) \frac{41}{200} = 0.205$$

$$d) \frac{119 + 41 + 32}{200} = 0.96$$

49



a)



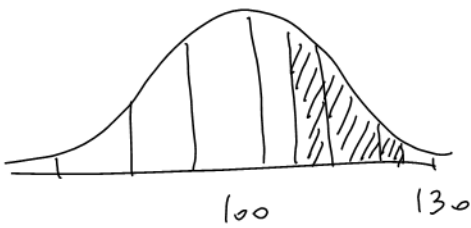
At least 50%

b)



0%

c)



Strictly between 0% and 50%

(50)

$$a) \mu = \bar{x} \pm z \frac{\sigma}{\sqrt{n}}$$

$$= 191 \pm 1.96 \left(\frac{22}{\sqrt{40}} \right)$$

$$= 191 \pm 7$$

95% confidence interval for μ :

$$\$184 \leq \mu \leq \$198$$

b) The confidence interval would get wider because the term $z \frac{\sigma}{\sqrt{n}}$ would get larger.