25 pts.

ISE 2211 • Exam I • 19 May 2020 NAME SOLUTION

→ S {A B C D E F G}

1) Consider two events contained in a sample space such that E_1 is the event {A B C} with respective probabilities 0.22, 0.23, and 0.07, and E_2 is the event {D E F G} with respective probabilities 0.[illegible], 0.21, 0.09, and 0.14.
Are these events mutually exclusive?

yes; no outcomes common to E_1 and E_2 +1

2) Determine the outcomes associated with the following set operations, and the final probability of each:

$E_1 \cap E_2$

$\emptyset$ +1 0 or 0% +1

$E_1 \cup E_2$

{A B C E F G} +1 0.22 + 0.23 + 0.07 + 0.21 + 0.09 + 0.14 = 0.96 or 96% +1

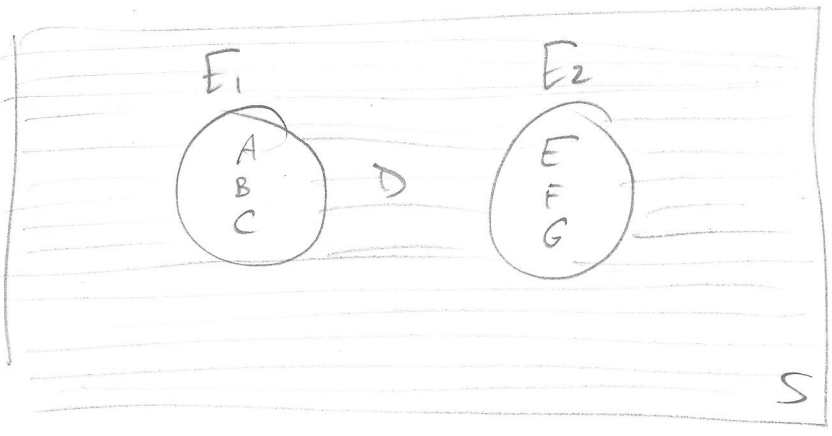
$E_1 \cap E_2'$

$E_2' = \{A B C D\}$ +1 ∴ {A B C} ∩ {A B C D} = {A B C} +1 0.22 + 0.23 + 0.07 = 0.52 or 52% +1

$E_1' \cup E_2'$ $E_1' = \{D E F G\}$ +1

{D E F G} ∪ {A B C D} = {A B C D E F G} or simply S +1 1 or 100% +1

Draw a Venn diagram, showing all outcomes in the sample space and the events E_1 and E_2, shaded for the set operation $(E_1 \cup E_2)'$.



+1

$(E_1 \cup E_2)' = D$ +1 shading +1

2) The following is a random sample of exam grades:
{82 90 80 84 71 92 82 87 91 79} (points)
Compute the sample mean, sample variance, sample standard deviation, and sample range, and include a unit with each answer. Draw a histogram displaying relative frequencies using three bins with the following upper bin boundaries: 80, 90, 100.

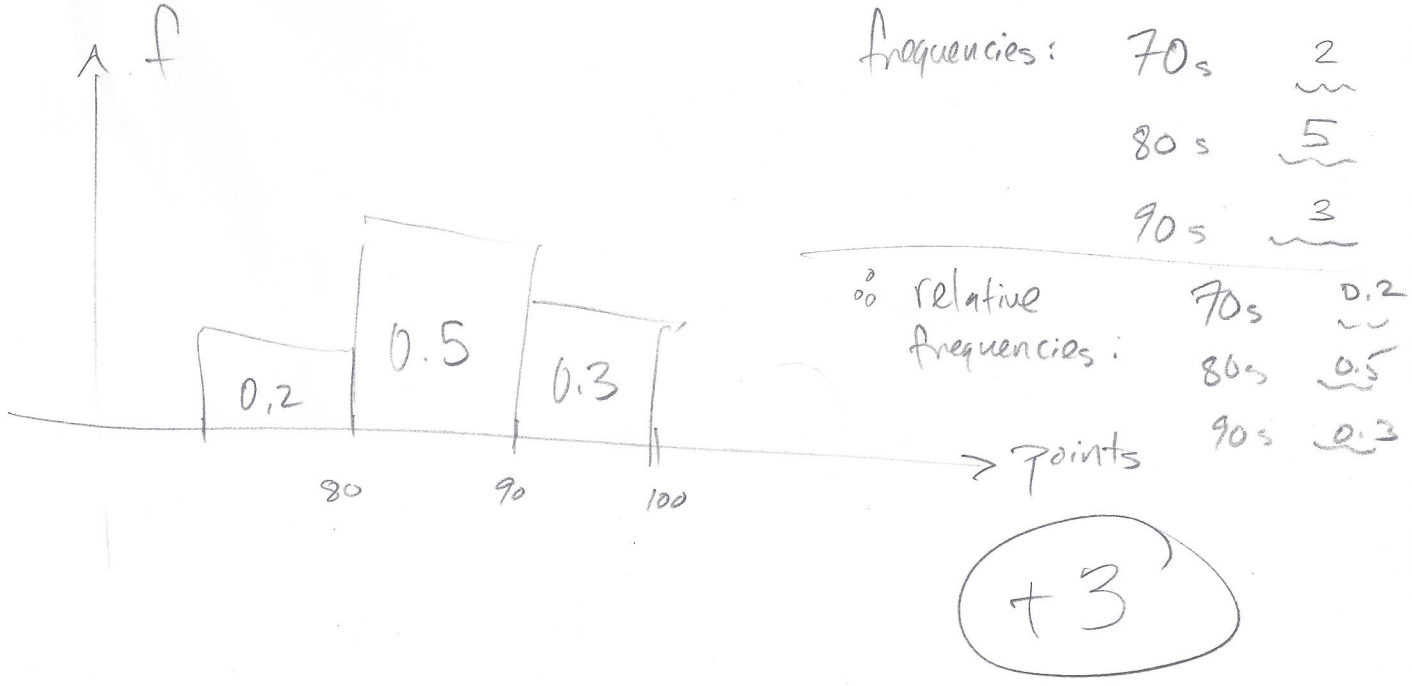
Hint: $s^2 = \frac{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}{n-1}$

$\bar{X} = 83.8$ points (+2)

$s^2 = 41.73$ points^2 (+2)

$s = 6.460$ points (+2)

$r = 21$ points (+2)



frequencies: 70s 2
80s 5
90s 3

relative frequencies: 70s 0.2
80s 0.5
90s 0.3

+3