

Quiz 2

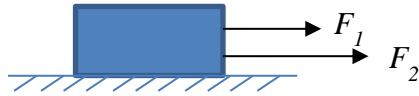
Please put your answers in the following table.

1	2	3	4	5	6	7	8	9	10

- Six samples of the length of a beam are (2.1, 2.2, 2.0, 1.9, 2.0, 2.1) m, what is the average length?
A) 2.0 m
B) 1.9 m
C) 2.1 m
D) 2.05 m
- In problem 1, what is the standard deviation of the beam length?
A) 0.0 m
B) 0.105 m
C) 0.2 m
D) Cannot determine
- In problem 1, what is the median of the beam length?
A) 2.0 m
B) 1.9 m
C) 2.1 m
D) 2.05 m
- A standard deviation indicates the dispersion of a random variable. (True or False)
- The CDF of a random variable at positive infinity is 1.0. (True or False)
- A crate is subject to two independently and normally distributed random forces $F_1 \sim N(100, 6^2)$ N and $F_2 \sim N(120, 8^2)$ N. The two forces act in the opposite directions as shown, the mean and standard deviation of the resultant force are



- 220 N and 10 N, respectively.
 - 220 N and 7 N, respectively.
 - 20 N and 14 N, respectively.
 - 20 N and 10 N, respectively.
- In problem 6, the distribution of the resultant force cannot be determined. (True or False)
 - In problem 6, if the two forces act in the same direction, which statement is true for the resultant force?



- A) μ_F and σ_F will remain the same.
- B) μ_F will change, and σ_F will not.
- C) μ_F and σ_F will both change.
- D) Cannot be determined.
9. The strength and stress of a component are independently distributed with normal distributions $Y \sim N(100, 8^2)$ kN and $X \sim N(90, 6^2)$ kN, respectively. The reliability of the component is defined by the probability $R = \Pr(Y > X)$. The reliability of the component is
- A) $\Phi(1)$
- B) $\Phi(-1)$
- C) $1 - \Phi(1)$
- D) 0
10. In problem 9, keeping stress X constant but changing strength to $Y \sim N(100, 12^2)$ kN will improve reliability. (True or False)