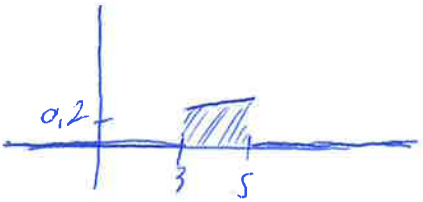
1. DEFINE f AS FOLLOWS.

$$f(x) = \begin{cases} 0.075x + 0.2, & 3 \le x \le 5, \\ 0, & \text{ELSE.} \end{cases}$$



(a) VERIFY THAT f IS A PDF.

(b) CALCULATE THE PROBABILITY THAT $x > 4$.

(c) FIND Q_1.

2. THE TIME A COMPUTER MOTHERBOARD LASTS IS EXPONENTIALLY DISTRIBUTED WITH AN AVERAGE LIFE SPAN OF 10 YEARS.

(a) WHAT IS THE PROBABILITY THAT A MOTHERBOARD LASTS AT LEAST 7 YEARS?

(b) WHAT IS THE PROBABILITY THAT A MOTHERBOARD LASTS BETWEEN 9 AND 11 YEARS?

3. THE RETIREMENT AGE OF NFL PLAYERS IS NORMALLY DISTRIBUTED WITH MEAN 33 AND VARIANCE 4 YEARS.

(a) WHAT IS THE PROBABILITY THAT A PLAYER RETIRES BETWEEN 36 AND 39 YEARS OLD?

(b) 90% OF PLAYERS RETIRE BEFORE WHAT AGE?

4. A DATA SET HAS MEAN 128 AND STANDARD DEVIATION 22.

(a) FIND THE EXPECTED VALUE AND STANDARD DEVIATION FOR SAMPLES OF SIZE 36.

(b) WHAT IS THE PROBABILITY THAT THE MEAN OF SUCH A SAMPLE IS WITHIN 10 UNITS OF THE POPULATION MEAN?

(c) SUPPOSE YOU DON'T KNOW THE STANDARD DEVIATION, SO YOU TAKE A SAMPLE OF 36 AND CALCULATE ITS STANDARD DEVIATION TO BE 16. REPEAT (b) UNDER THIS CONDITION.

5. EXAM SCORES ARE NORMALLY DISTRIBUTED WITH $\sigma = 5.6$, A RANDOM SAMPLE OF 40 SCORES HAS MEAN 82. ESTIMATE THE POPULATION MEAN WITH CONFIDENCE (a) 50%, (b) 90%, (c) 98%.

6. 250 TEACHERS WERE ASKED IF COMPUTERS ARE AN ESSENTIAL TEACHING TOOL; 142 SAID YES, THE REST SAID NO. CALCULATE A 99% CONFIDENCE INTERVAL FOR THE PROPORTION OF TEACHERS WHO FEEL THAT COMPUTERS ARE ESSENTIAL.