Math 10 Winter 2018 **Name Last** Form B **First** Pink Key
Quiz Ch 5 & 6 Continuous Probability Distributions Form B

You must show work requested, showing use of geometry and algebra, formula or calculator command. Follow rounding instructions for each problem.

If a graph is required, it must be labeled to show all important values and shaded to indicate the region representing the probability. Graphs should be reasonably representative of the situation. Label X values below the graph along the x axis. Label areas inside or above the graph.

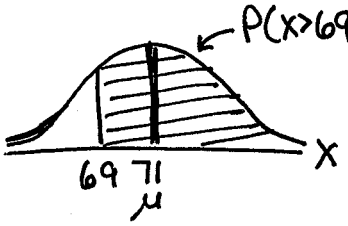
If a question asks for a symbolic mathematical probability statement it is asking to answer in the form of P(X < 10) = 0.32 or P(X > 10) = 0.68 or P(6 < X < 8) = 0.37; it is not asking for a sentence.

1. [8 points] Sources: https://theblog.okcupid.com/the-big-lies-people-tell-in-online-dating-a9e3990d6ae2
https://biology.stackexchange.com/questions/9730/what-is-the-standard-deviation-of-adult-human-heights-for-males-and-females
http://abcnews.go.com/Technology/story?id=98438

The distribution of heights of men registered on online dating site OK Cupid follows a normal probability distribution with a mean of 71 inches. Suppose that the standard deviation is 2.9 inches.

X = height of a man registered on online dating site OK Cupid $X \sim N(71, 2.9)$

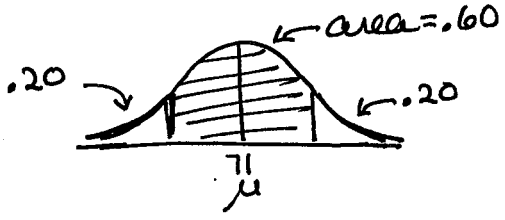
a. **Find the probability that the height of a randomly selected man registered on online dating site OK Cupid is more than 69 inches.**
- **Show work** finding the requested probability. Round your answer to 3 decimal places.
- **Graph Required**: Draw and shade the graph and label all important values.
- **State your final answer in the form of a symbolic mathematical probability statement.**



normalcdf(69, 10^99, 71, 2.9)

$P(X > 69) = .755$

b. **The middle 60% of heights are between** 68.6 **and** 73.4 **inches.**
- **Show work** finding the requested values. *Round your answers to 1 decimal place ; tenths of an inch.*
- **Graph Required**: Draw and shade the graph.
  Below the X axis, label all important X values.
  Label the sizes of all areas above or inside the graph.



invnorm(.2, 71, 2.9) = 68.559 ≈ 68.6

invnorm(.8, 71, 2.9) = 73.449 ≈ 73.4

$P(68.6 < X < 73.4) = .6$

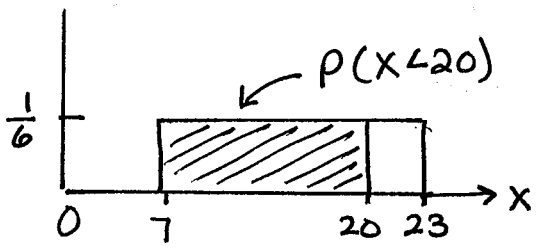
Form B

Form B Pink Key

2. [7 points] Anand is a pre-school teacher. Suppose the amount of time that Anand reads stories to his pre-school class each day is uniformly distributed between 7 and 23 minutes.

a. Find the probability that Anand reads to his class for less than 20 minutes.

- **Show work** finding the requested probability. *Round your answer to 4 decimal places.*
- **Graph Required**: Draw and shade the graph and label all important values.
- **State your final answer in the form of a symbolic mathematical probability statement.**



$P(X<20) = \text{area} = (\text{base})(\text{height})$

$= (20-7)\left(\frac{1}{16}\right)$

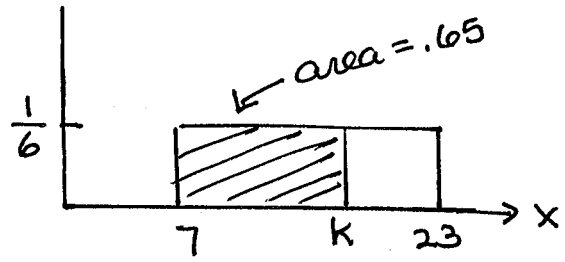
OR

$(20-7)(.0625)$

$\boxed{P(X<20) = \frac{13}{16} = .8125}$

b. Find 65th percentile for the daily amount of time that Anand reads to his class.

- **Show work** finding the requested value(s). *Round your answer to 1 decimal place ; tenths of a minute.*
- **Graph Not Required**: But it may be helpful - you can draw one if it helps you solve this problem.



$\text{area} = (\text{base})(\text{height})$

$.65 = (k-7)\left(\frac{1}{16}\right)$ OR $.65 = (k-7)(.0625)$

$16(.65) = k-7$ | $\frac{.65}{.0625} = k-7$

$10.4 = k-7$ | $10.4 = k-7$

$\boxed{k = 17.4}$ | $\boxed{k = 17.4}$

3. [5 points] TalkIsCheap Company finds that the lengths of cell phone calls follows an exponential distribution with a mean of 2.38 minutes. $\mu = 2.38$

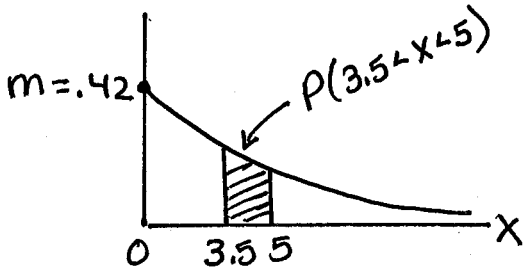
X = the length of a cell phone call

Write the distribution for X: X~Exp(.42) or Exp(1/2.38)

$\mu = 2.38$ so $m = \frac{1}{\mu} = \frac{1}{2.38} = .42$

Find the probability that the length of a cell phone call is between 3.5 and 5 minutes.

- **Show work** finding the requested probability. *Round numbers to 3 decimals points in all calculations.*
- **Graph Required**: Draw and shade the graph and label all important values.
- **State your final answer in the form of a symbolic mathematical probability statement.**



$P(3.5<X<5) = e^{-.42*3.5} - e^{-.42*5}$

$e\wedge(-.42*3.5) - e\wedge(-.42*5)$

$\boxed{P(3.5<X<5) = .107}$