Measurement and Statistics

1. Use the following information to solve the following questions:

   $1.00 US = $1.31 CAN

   1.0 US gallons = 3.79 litres

   a) A car has a gas tank capacity of 36.0 US gallons. How many liters is this equal to? (Rounded to the nearest litre.)

   $$\frac{3.79}{1.0} = \frac{x}{36.0}$$

   $$x = 136\ L$$

   b) If you have $220.00 CAN, what is this equal to in US dollars?

   $$\frac{1.00\ US}{1.31\ CAN} = \frac{x}{220.00}$$

   $$x = 167.94$$

   c) The price of gas in Billings Montana is $2.17 US/gallon. What will it cost, in Canadian dollars, to fill a 76 litre gas tank in Billings Montana?

I. L = US gallons

$$\frac{3.79}{1.0} = \frac{76}{x}$$

$$\boxed{x = 20}.0528$$

II US $

$$\frac{\$2.17}{1g} = \frac{x}{20g}$$

$$x = \$43.40\ US$$

III CAN = US

2. The following test scores were for the last math exam.

I. clear list
II new ?
L_1 L_2

90	84	77	66
89	84	77	65
86	82	75	65
86	81	72	61
84	79	70	56

Determine the following

$\bar{x}$ Mean: 76.45 = 76

mid Median: 78

most Mode: 84

σ Standard Deviation: 9.60

Add 5 to all scores?

$\bar{x} = 76 + 5 = 81$

MED = 78 + 5 = 83

$\sigma = 9.6$

3. Ramsey is taking Math and English as her core subjects this semester.

a) Determine Ramsey's actual mark in Math if her z-score ranking is 2.25, the class average is 64% and the standard deviation is 8.0%.

$z = \frac{x - \mu}{\sigma}$

$2.25 = \frac{x - 64}{8}$

$18 = x - 64$

$\boxed{x = 82}$

b) Determine the class average of Ramsey's English class given the standard deviation of marks is 6.0% and her English mark of 64% represents a z-score of – 1.33.

$z = \frac{x - \mu}{\sigma}$

$\sigma = 6$

$x = 64$

$z = -1.33$

$-1.33 = \frac{64 - \mu}{6}$

$-7.98 = 64 - \mu$

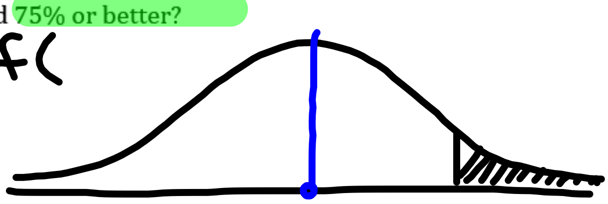
$\mu = 64 + 7.98$

$\mu = 71.98$

$\mu = 72$

4. Last year's marks on this statistics exam had a mean of 60% and standard deviation of 9%. What is the percentage of students that scored 75% or better?

AREA = normalcdf(
lower
upper



$z = \frac{75-60}{9}$

$\sigma = 9$ z ⟶ z

$z = \frac{15}{9} = 1.67$ A: normalcdf(1.67, 5) = 0.047

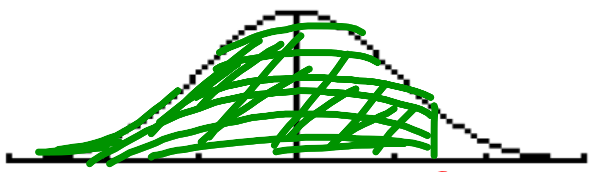
4.7%

5. The mass of jelly beans in a bag is normally distributed with an average of 850 grams and a standard deviation of 2.50 grams.

a) Find the z-score for a bag that weighs 853 grams.

$z = \frac{853-850}{2.50} = 1.2$

b) Shade the bell curve to represent all the bags of jelly beans that weight 853 grams or ~~more.~~ less



c) What is the probability of buying a bag of jelly beans that weighs 853 grams or ~~more?~~ less.

A: normalcdf

lower: -5

upper: 1.2

normalcdf(-5, 1.2)

0.88493

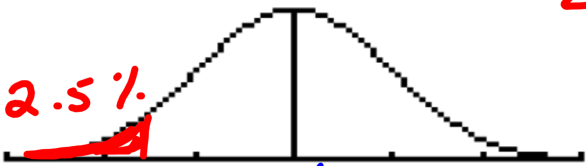
88%

6. A tire manufacturer knows the average life for their all-season tires is normally distributed with an average of 92000 km and a standard deviation of 3500 km.

   a) The manufacture wants to determine the tire life for the bottom 2.5% of their tires. Shade the curve and determine the z-score representing at most 2.5 % of the population.

$z = \text{invNorm}(\text{area})$

"below"



$z = \text{invNorm}(0.025) = -1.96$

   b) Use the z-score to determine the actual tire life, rounded to nearest 1000 km.

$$z = \frac{x-\mu}{\sigma}$$

$z = -1.96$

$\mu = 92000$

$\sigma = 3500$

$$-1.96 = \frac{x - 92000}{3500}$$

$-6860 = x - 92000$

$85140 = x$

7. A group of students recorded their pulse rates after a 2 km run.

126	168	158	192	146	166	104	164	116	138
158	132	156	160	108	150	178	136	172	140
136	174	156	176	150	166	142	156	130	182
144	150	142	152	174	176	118	152	178	164

Complete the frequency table with ten intervals to organize the pulse rates. [1]

Pulse Rates	Tally	Frequency
100-109		2
110-119		2
120-129	|	1
130-139	|	5
140-149	|	5
150-159	|	10
160-169		6
170-179		7
180-189		1
190-199		1