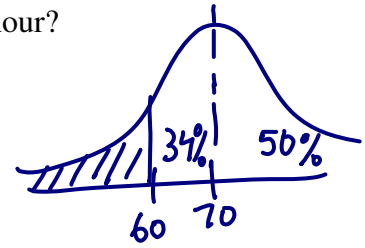
Ch 2 Review Solutions!

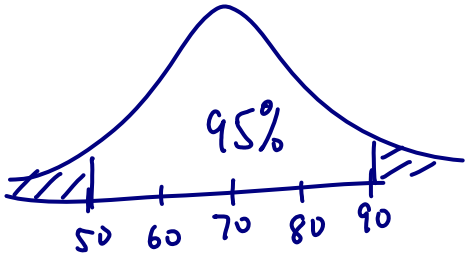
Part 1: Multiple Choice. *Circle the letter corresponding to the best answer.*

1. The time to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. Using the 68-95-99.7 Rule, what percentage of students will complete the exam in under an hour?
(a) 68%
(b) 32%
(c) 16%
(d) 5%

50 − 34 = 16



2. Use the information in the previous problem. Only about 5% of students complete the exam outside the range
(a) 40 minutes to 90 minutes
(b) under 40 minutes
(c) 60 minutes to 80 minutes
(d) 50 minutes to 90 minutes
(e) over 90 minutes



3. What is the area under the standard normal curve corresponding to Z<1.1?
(a) 0.1357
(b) 0.2704
(c) 0.8413
(d) 0.8643

```
normalcdf(-1E99,
1.1,0,1)
      .8643338987
```

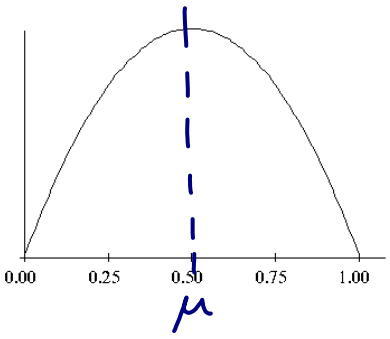
4. Birthrates at a local hospital have a normal distribution with a mean of 110 ounces and a standard deviation of 15 ounces. The proportion of infants with birthweights under 95 ounces is:
(a) 0.500
(b) 0.159
(c) 0.341
(d) 0.841

```
normalcdf(-1E99,
95,110,15)
      .1586552596
```

5. Using the information from question 4, what proportion of infants will have birthweights between 125 and 140 ounces?
(a) 0.819
(b) 0.636
(c) 0.477
(d) 0.136

```
normalcdf(125,14
0,110,15)
      .1359051975
```

6. For the density curve shown, what is the mean?
(a) 0
(b) 0.25
(c) 0.50
(d) 0.75
(e) None of the above



7. What is the area under the standard normal curve corresponding to -0.5<Z<1.2?
(a) 0.3805
(b) 0.8849
(c) 0.5764
(d) 0.2815

```
normalcdf(-.5,1.
2,0,1)
      .5763927362
```

8. A soft-drink machine can be regulated so that it discharges an average of μ ounces per cup. If the ounces of fill are normally distributed with a standard deviation of 0.4 ounces, what value should μ be set at so that 6-ounce cups will overflow only 2% of the time?
(a) 6.82
(b) 6.00
(c) 5.18
(d) 5.60

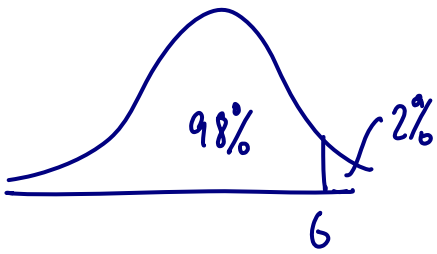
z-score for 98% is 2.05

```
invNorm(.98,0,1)
      2.053748911
```

$\therefore 2.05 = \frac{6-\mu}{0.4}$

$0.82 = 6-\mu$

$\mu = 5.18$



9. A company produces packets of soap powder labeled "Giant Size 32 Ounces". The actual weight of the soap powder in a box has a normal distribution with a mean of 33 ounces and a standard deviation of 0.7 ounces. Ninety-five percent of packets actually contain more than *x* ounces of soap powder. What is *x*?
(a) 34.40
(b) 34.15
(c) 31.85
(d) 31.60

```
invNorm(.05,33,.
7)
      31.84860246
```

10. The time to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. How much time should be given to complete the exam so that 80% of the students will complete the exam in time?
(a) 84 minutes
(b) 78.4 minutes
(c) 92.8 minutes
(d) 79.8 minutes

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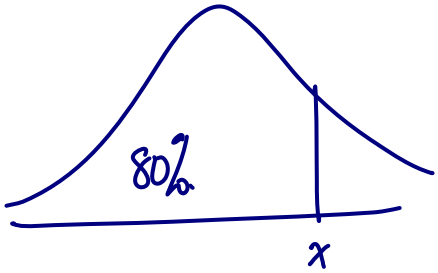
invNorm(.8,70,10
)
      78.41621233
```



Part 2: Free Response

11. A lunch stand in the business district has a mean daily gross income of $420 with a standard deviation of $50. Assume that the daily gross income is normally distributed.

a. If a randomly selected day has a gross income of $520, then how many standard deviations away from the mean is that day's gross income? z-score!

$$z = \frac{520-420}{50} = 2. \quad \therefore 2\sigma_s \text{ from mean.}$$

b. What is the relative frequency corresponding to a daily gross income of $520 or more?

normalcdf(520, 1E99, 420, 50) = 0.0228

2.28% of time, income is 520 of greater

c. A neighbouring lunch stand has a mean daily gross income of $470 with a standard deviation of $40. On the same day they had a gross income of $550. Which lunch stand had the better day, relative to their mean?

$$z_N = \frac{550-470}{40} = 2$$

Both stands have a z-score of 2 which means that they have had equivalent days.

12. In a normally distributed population, what percent of the population observations lie within 1.289 standard deviations of the mean? Include a sketch to illustrate your answer.

normalcdf(−1.289, 1.289, 0, 1)

= 0.8026

= 80.26%

13. The scores on a university exam are normally distributed with a mean of 62 and a standard deviation of 11.

(a) What is the percent of students score more than 85?

normalcdf (85, 1E99, 62, 11) = 0.0183
= 1.83%

(b) If the bottom 30% of students will fail the course, what is the lowest mark that a student can have and still pass the course?

invNorm (0.3, 62, 11) = 56.23

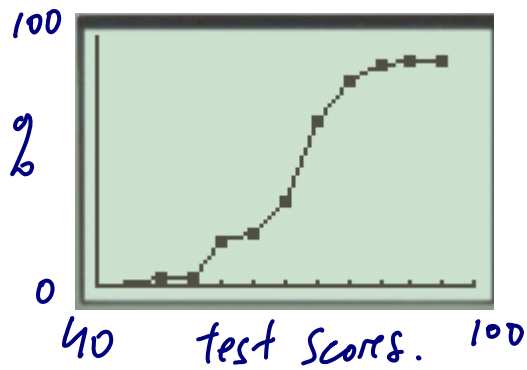
Lowest Passing Mark is 57.

14. The following table gives you the scores of thirty students on a math test.

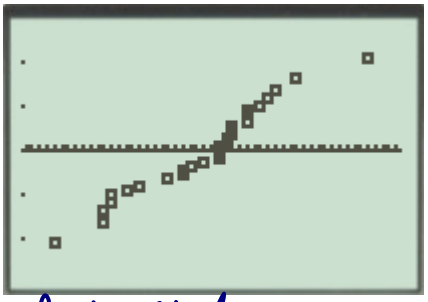
72	72	93	70	59	78	74	65	73	80
57	67	72	57	83	76	74	56	68	67
74	76	79	72	61	72	73	76	56	49

(a) Construct a cumulative relative frequency histogram for this data set.

(b) Is the data set approximately normal?



b) Data is approx normal since the prob plot is fairly linear. and OGIVE is fairly symmetrical.



Prob Plot.