

1. For the following determine if the variable is Continuous or Discrete
  - a. The height of incoming Freshman at Cabrini continuous
  - b. The SAT scores of incoming Freshman at Cabrini discrete
  - c. Number of wins Penn State Football team had in 2007 discrete
  - d. Daily temperatures for the month of May continuous
  - e. Number of Democrats in PA discrete

The following data represents the weights of 20 players on the Super Bowl Champion NYC Giants team. Find the Range and complete a frequency chart using 5 classes.

~~185, 225, 240, 275, 295, 190, 273, 223, 226, 238, 290, 280, 350, 295, 230, 235, 300,~~  
190, 271, 259

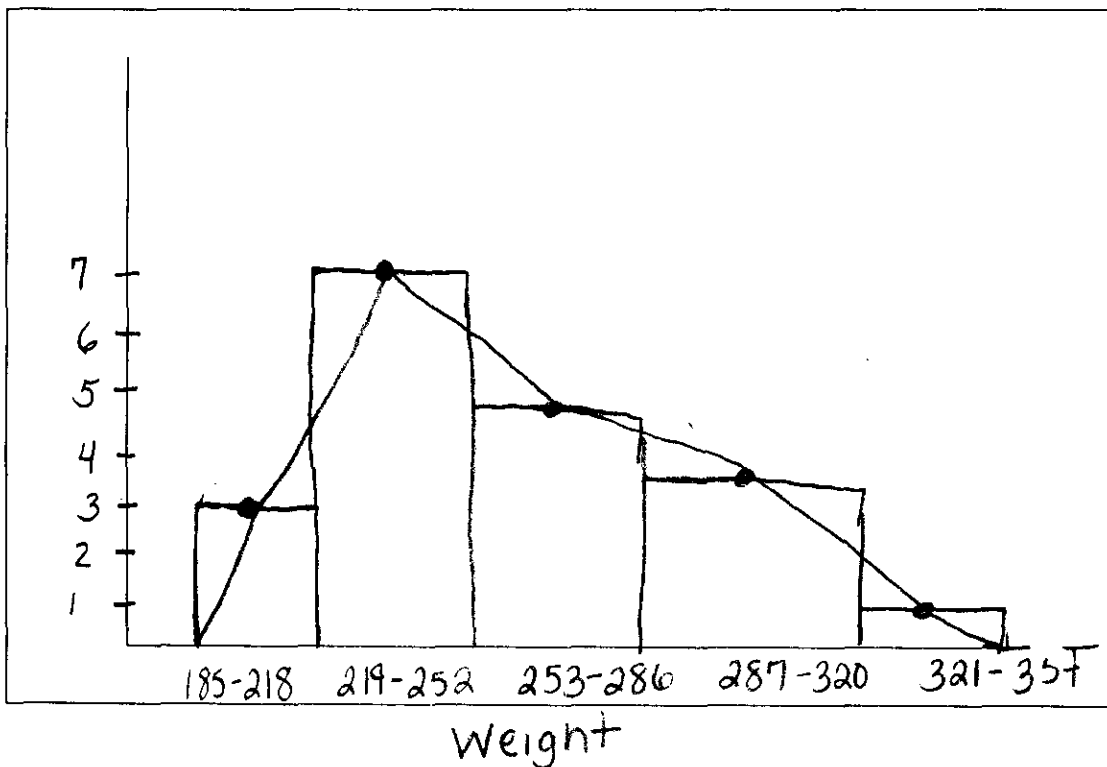
Range =  $350 - 185 = 165$

Class Width -  $33$

Note: Each class interval should be the same width

Class Interval - Test Score Weight	Tally	Frequency
185 - 218		3
219 - 252		7
253 - 286		5
287 - 320		4
321 - 354		1

Histogram & Frequency Polygon



2. During the 2007 football season Penn State had the following scores in their games. Find the Mean, Mode, & Median for these scores.

9 17 26 24 26 27 31 31 31 36 38 45 59  
 24, 31, 31, 26, 17, 36, 38, 27, 20, 9, 45, 31, 59

Mean: 30.3 Mode 31 Median 31

Penn State's opponents in the 2007 football season had the following scores:  
 17, 35, 0, 19, 37, 31, 7, 7, 27, 14, 24, 10, 6

Find the Mean, Range, Variance, and Standard Deviation using the population variance and population standard deviation equations for Penn State's opponent's scores.

Range:  $37 - 0 = 37$  Mean 18

Variance  $(\sigma^2)$  133 Standard Deviation  $(\sigma)$  11.5

$$\text{Variance} = \sigma^2 = \frac{1728}{13} = 133$$

$$\text{std dev} = \sigma = \sqrt{133} = 11.5$$

$x_i$	$(x_i - \mu)$	$(x_i - \mu)^2$
17	$17 - 18 = -1$	1
35	$35 - 18 = 17$	289
0	$0 - 18 = -18$	324
19	$19 - 18 = 1$	1
37	$37 - 18 = 19$	361
31	$31 - 18 = 13$	169
7	$7 - 18 = -11$	121
7	$7 - 18 = -11$	121
27	$27 - 18 = 9$	81
14	$14 - 18 = -4$	16
24	$24 - 18 = 6$	36
10	$10 - 18 = -8$	64
6	$6 - 18 = -12$	144
Totals	0	1728

3. Based on data from USA Today the ages of a random sample of 300 adults who shop by catalog are shown below. Use this data to estimate the mean.

Class Interval - Age	Frequency ( $f_i$ )	Midpoint ( $m_i$ )	$(f_i \cdot m_i)$
18-24	78	21	1638
25-34	75	29.5	2212.5
35-44	48	39.5	1896
45-54	33	49.5	1633.5
55-64	33	59.5	1963.5
65-80	33	72.5	2392.5
Totals	300		11736

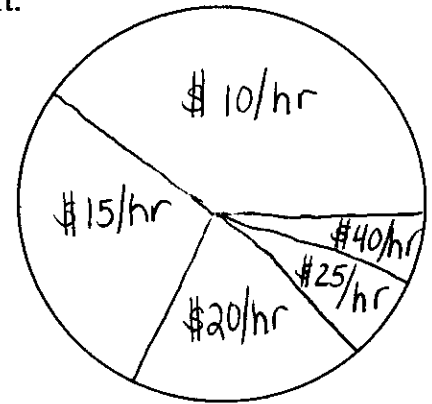
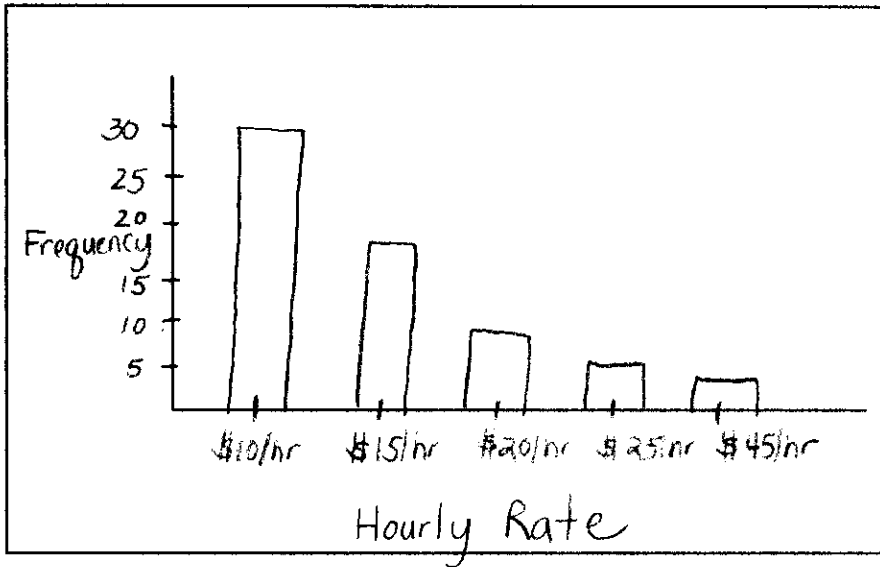
Mean  $\frac{11736}{300} = 39.12$

Why is the mean just an estimate? because we don't have actual scores

4. Given the following data on hourly pay rates for employees of Make Big Bucks construct a bar graph and a pie chart. For extra credit you can calculate the mean, mode, and median for the data in this frequency table.

Hourly Rate	Frequency	Percent	Degrees
\$10.00	30	44.8	161
\$15.00	18	26.9	97
\$20.00	10	14.9	54
\$25.00	7	10.4	38
\$40.00	2	.03	11
Totals	67		361

Pie Chart:



Group Mean (Extra Credit +2 pts): \$15.3/hr

Mode (Extra Credit +1 pt): \$10/hr

Median (Extra Credit +1 pt): \$15/hr

6. The following is a SAMPLE of prices for houses recently sold in Smalltown. Calculate the Range, Variance, & Standard Deviation.

Selling Price (\$000)	$(x - \bar{x})$	$(x - \bar{x})^2$
220	$220 - 380 = -160$	25600
300	$300 - 380 = -80$	6400
400	$400 - 380 = 20$	400
370	$370 - 380 = -10$	100
620	$620 - 380 = 240$	57600
310	$310 - 380 = -70$	4900
350	$350 - 380 = -30$	900
470	$470 - 380 = 90$	8100
520	$520 - 380 = 140$	19600
240	$240 - 380 = -140$	19600
		143200

Mean 380

Range 400      Variance 15911.7      Standard Deviation 126

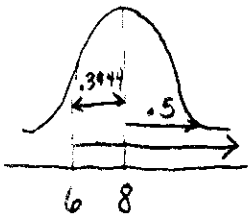
↓  
 $620 - 220 = 400$

$$s^2 = \frac{143200}{(10-1)}$$

$$s^2 = 15911.7$$

7. Dirty Dishes Company makes dishwashers. After many years of product testing the company knows that the average life of a dishwasher is normally distributed with a mean of 8 years and a standard deviation of 1.6 years.

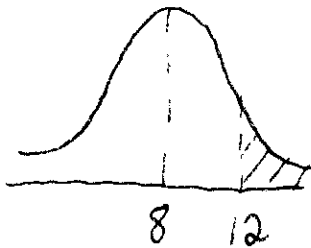
a. What percentage of dishwashers last more than 6 years? 89.44%



$$z_6 = \frac{6-8}{1.6} = -1.25 \quad \text{area} = .3944$$

Area = .5 + .3944 = .8944  
 I want

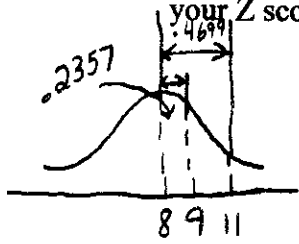
b. What percentage of dishwashers last more than 12 years? .62%



$$z_{12} = \frac{12-8}{1.6} = 2.5 \quad \text{area} =$$

Area I want = .5 - .4938  
 = .0062

- c. What percentage of dishwashers last between 9 and 11 years? (Round your Z scores to the hundredths digit) 23.42%

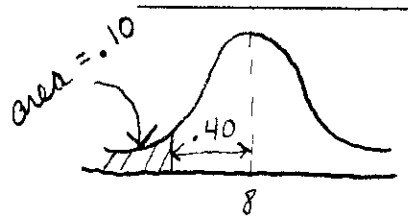


$$z_9 = \frac{9-8}{1.6} = .63 \quad \text{area} = .2357$$

$$z_{11} = \frac{11-8}{1.6} = 1.88 \quad \text{area} = .4699$$

$$\text{Area I want} = .4699 - .2357 = .2342$$

- d. EXTRA CREDIT (+3 pts.) If Dirty Dishes does not want to make refunds for more than 10% of its dishwashers under the full-refund guarantee policy, for how long should the company guarantee the dishwasher?



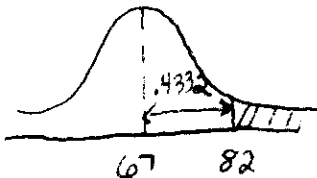
$z$  for .10  $\approx -1.29$   
let  $z = -1.29$ , solve for  $x$

$$-1.29 = \frac{x-8}{1.6}$$

$$x \approx 5.9 \text{ years}$$

8. You are planning a trip to Seattle, Washington in June. The daytime high temperature in Seattle during June is normally distributed with a mean of 67°F and a standard deviation of 10°F

- a. What is the probability that you will encounter daytime highs of 82°F or higher? 6.68%



$$z_{82} = \frac{82-67}{10} = 1.5 \quad \text{area} = .4332$$

$$\text{Area I want} = .5 - .4332 = .0668$$

- b. What is the probability that you will encounter daytime highs between 50°F and 75°F? 74.35%

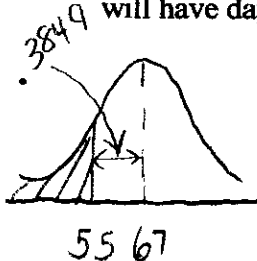


$$z_{50} = \frac{50-67}{10} = -1.7 \quad \text{area} = .4554$$

$$z_{75} = \frac{75-67}{10} = .8 \quad \text{area} = .2881$$

$$\begin{aligned} \text{Area I want} &= \\ &= .4554 + .2881 \\ &= .7435 \end{aligned}$$

- c. If there are 30 days in June, on average, how many days in June in Seattle will have daytime highs lower than 55°F? 3 days



$$z_{55} = \frac{55-67}{10} = -1.2 \quad \text{area} = .3849$$

$$\text{Area I want} = .5 - .3849 = .1151$$

$$\begin{aligned} \# \text{ of days} &= 30 * .1151 = 3.453 \rightarrow 3 \\ &< 55^\circ \end{aligned}$$

★ gives  $x$  looking for  $z$  & area

$x$  values

9. Given the following  ~~$x$  scores~~ and values for the population mean ( $\mu$ ) and population standard deviation ( $\sigma$ ) calculate the Z-score and area from the z score to the mean.

a.  $\mu=77.5, \sigma=10, x=92.2$   $z = \underline{1.47}$  Area .4292

$$z = \frac{x - \mu}{\sigma} = \frac{92.2 - 77.5}{10} = 1.47$$

b.  $\mu=900, \sigma=100, x=831$   $z = \underline{-.69}$  Area .2549

$$z = \frac{x - \mu}{\sigma} = \frac{831 - 900}{100} = -.69$$

★ you are looking for  $x$

10. Given the following  $z$  values, and values for population mean ( $\mu$ ) and population standard deviation ( $\sigma$ ) calculate the Z scores.

a.  $\mu=250, \sigma=20, z=1.23$   $x = \underline{26.6}$

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

$$1.23 = \frac{x - 2}{20}$$

$$24.6 = x - 2$$

$$x = 26.6$$

b.  $\mu=75, \sigma=10, z=-1.52$   $x = \underline{59.8}$

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

$$-1.52 = \frac{x - 75}{10}$$

$$-15.2 = x - 75$$

$$x = 59.8$$

11.

- a.) List 3 measures of central tendency.

mean, mode, median

- b.) What is the mode, mean, & median of the following data?

19 19 27 28 18 35

Mode 19 Mean 24.3 Median 23

18 19 19 27 28 35

$$\text{median} = \frac{19 + 27}{2} = 23$$

- c.) List 3 measures of dispersion.

range, variance, standard deviation