

1. Tim wants to know the soda preference of the juniors at LHS, so 60 juniors are asked to name their favorite soda.
 - a) State the population and sample.
 - b) How should the 60 juniors be selected to ensure that the sample is random?
 - c) Would this survey be representative of the soda preferences of the teachers? Why or why not?
2. Categorize the following sampling methods as stratified, systematic, cluster, convenience, or simple random.
 - a) Pick a random sample of teachers and ask how many kids they have.
 - b) Take a random sample of five zip codes in Kansas. Count the number of pets every person has in each zip code.
 - c) Ask your friends at lunch what they're doing Friday night.
 - d) Divide the class up based on their ages and then select a random sample from each age group to survey their favorite colors.
 - e) Check the quality of every seventh car that comes off the assembly line.

3. Which of the following are types of histograms?

- A. Uniform B. Bimodal C. Symmetrical D. Skewed E. All of these

4. Which of the following are levels of measurement?

- A. Nominal B. Ordinal C. Interval D. Ratio
E. Normal F. Ordinary G. Intermittent H. Rated

5. Given the following data set: 11, 29, 41, 46, 46, 46, 47, 49, 54, 54, 59, 60, find...

- a) the mean b) the median c) the mode d) the range

6. Using the data in #5, make a...

- a) stem-and-leaf plot b) make a box-and-whisker plot

7. Using the following table:

x	1	2	3	3	4	6	7
y	9	7	7	6	7	4	4

- a) Draw a scatterplot. b) Find the equation of the least-squares line and graph it on the scatterplot.
- c) Find and explain r , the correlation coefficient. d) Find and explain r^2 , the coefficient of determination.
- e) Use the equation of the least-squares line to predict y if $x = 27$.

13. If $\mu = 100$ and $\sigma = 10$, find:

a) $P(x \leq 80)$

b) $P(x \geq 90)$

c) $P(70 \leq x \leq 110)$

14. Speedy Jet Computer Printers have a mean life of 4 years with a standard deviation of 0.78 years.

a) Find the z -score associated with a life of 6.5 years.

b) Find $P(x \geq 6.5)$

Chapter 6:

24. Change 240° to radians.

25. Change $\frac{\pi}{4}$ radians to degrees.

26. Find the length of an arc with radius 10m. associated with an angle of $\frac{3\pi}{5}$ radians.

27. Find the linear speed of a point on a circle with a ten foot diameter rotating at 15 radians/sec. Convert to mph.

What is the angular velocity of the second hand of a clock in radians per hour?

28. Find the exact values of the other five trig functions given that $\sin \theta = -\frac{3}{5}$ and θ is in quadrant IV.

29. Find the exact values of the following:

a) $\csc \frac{5\pi}{4}$

b) $\cos 2\pi$

c) $\sec \frac{\pi}{2}$

d) $\cot 390^\circ$

e) $\tan 90^\circ$

f) $\sin 240^\circ$

g) $\sin \frac{11\pi}{6}$

h) $\cot \frac{5\pi}{3}$

i) $\csc -150^\circ$ k) $\sec 135^\circ$

30. Find the following for the function $f(x) = -2 \cos x + 1$

a) period

b) amplitude

c) vertical shift

d) is there a reflection?

31. Graph the following trig. functions:

a. $y = 2\sin x + 1$

b. $y = \cos 2x$

c. $y = -\cos x - 3$

Semester 2 Review - Day 2

1. a) Population - UHS Juniors
Sample - 60 Juniors
- b) Random # table
- c) no, teachers are not asked

2. a) Random b) Cluster c) convenience
d) Stratified e) systematic

3. E

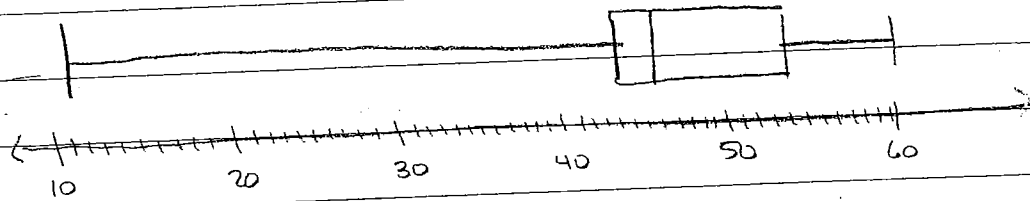
4. A, B, C, D

5. mean = 45.17 median = 46.5 mode = 46 range = 49

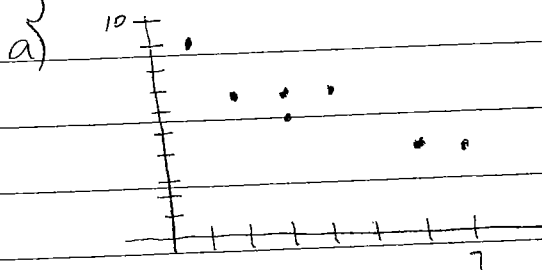
6. 11, 29, 41, 46, 46, 46, 47, 49, 54, 54, 59, 60

↑ ↑ ↑ ↑

min = 11 $Q_1 = 44.5$ median = 46.5 $Q_3 = 54$ max = 60



7.	x	1	2	3	3	4	6	7
	y	9	7	7	6	7	4	4



b) Calculator

Stat → Edit → enter values into L₁, L₂

Stat → Calc → LinReg
 $y = ax + b$

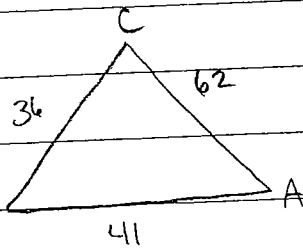
$y = -.781x + 9.188$

$$a = 36$$

$$b = 62$$

$$c = 41$$

$$\angle C = 39.207^\circ$$



$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

$$\cos C = \frac{36^2 + 62^2 - 41^2}{2(36)(62)}$$

$$= \frac{3459}{4464}$$

$$C = \cos^{-1} \left(\frac{3459}{4464} \right)$$

Do not worry about ambiguous case !!

$$35. \quad 0, 3, 8, 15, 24 \quad a_{11} = 120 \quad a_{23} = 528$$

36.

$$\sum_{n=1}^6 4n$$

$$4 + 8 + 12 + 16 + 20 + 24$$

Arithmetic $d = 4$

$$a_n = a_1 + (n-1)d$$

$$= 4 + (n-1)4$$

$$= 4 + 4n - 4$$

$$= 4n$$

$$37. \quad \sum_{n=1}^{23} (10 - 4n)$$

$$d = 4$$

$$a_1 = 6$$

$$a_{23} = -82$$

$$S_{23} = \frac{23}{2} (6 - 82)$$

$$= \boxed{-874}$$

Arithmetic (d)

$$38. \quad \sum_{n=1}^{21} 15 \cdot 2^n$$

$$r = 2$$

$$a_1 = 30$$

$$S_{21} = 30 \left(\frac{1-2^{21}}{1-2} \right)$$

$$= 30(2097151)$$

$$= \boxed{62914530}$$

Geometric (r)

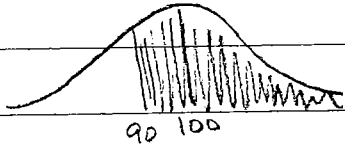
②

Semester 2 Review cont'd

b) $P(x \geq 90)$

$$z = \frac{90 - 100}{10}$$

$$z\text{-chart } e^{-1} = .1587$$



$$= -1$$

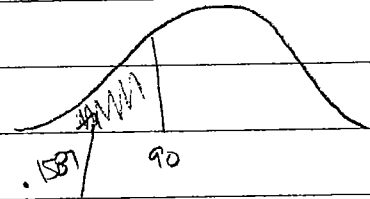


Chart gives left

$$\text{Right} = 1 - .1587$$

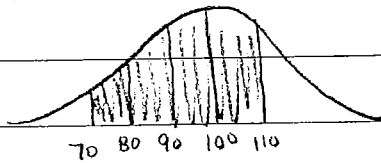
$$= .8413$$

$$P(x \geq 90) = \boxed{.8413}$$

c) $P(70 \leq x \leq 110)$

$$z = \frac{70 - 100}{10}$$

$$z = \frac{110 - 100}{10}$$

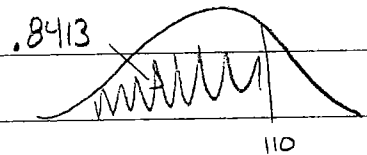
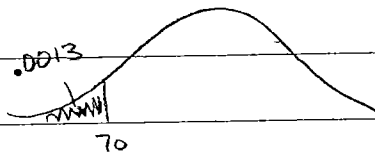


$$= -3$$

$$= 1$$

$$\text{Chart } e^{-3} = .0013$$

$$\text{Chart } e^1 = .8413$$



$$P(70 \leq x \leq 110) = .8413 - .0013$$

$$= \boxed{.84}$$

14. a) $x = 6.5$

$$z = \frac{6.5 - 4}{.78}$$

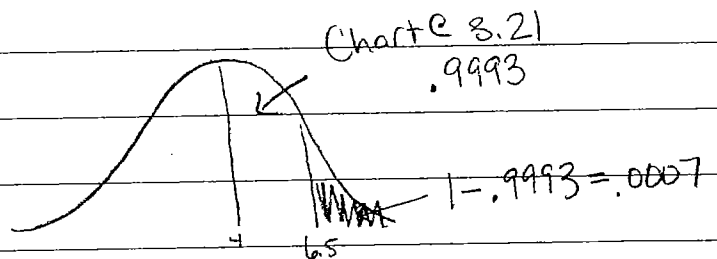
$$\mu = 4$$

$$.78$$

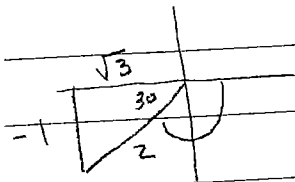
$$\sigma = .78$$

$$= \boxed{3.21}$$

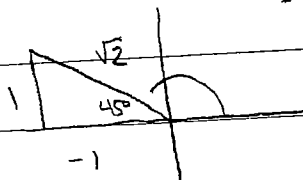
b) $P(x \geq 6.5) = \boxed{.0007}$



$$\csc -150^\circ = \boxed{-2}$$



$$\sec 135^\circ = \boxed{-\sqrt{2}}$$



$$30. f(x) = -2 \cos x + 1$$

$$\text{period} = \frac{2\pi}{2} = \pi$$

$$\text{amplitude} = 2 \text{ (not } -2)$$

VS = up 1

reflection in x-axis

$$f(x) = a \cos b(x-c) + d$$

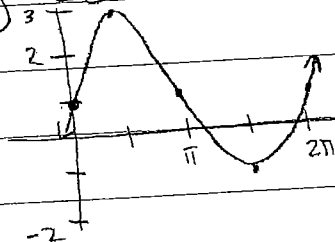
a = amplitude (always positive)
(tangent does not have amp)

b = period

c = horizontal (phase) shift

d = vertical shift

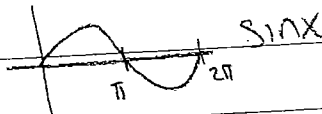
$$31. y = 2 \sin x + 1$$



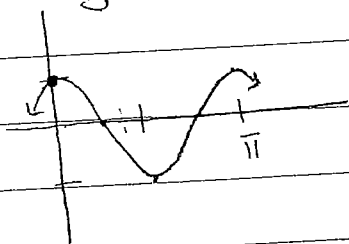
$$\text{Amp} = 2$$

up 1

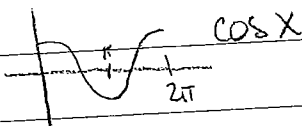
$$\text{Period} = 2\pi$$



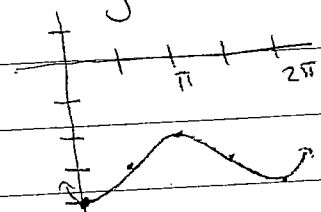
$$y = \cos 2x$$



$$\text{Period} = \pi$$

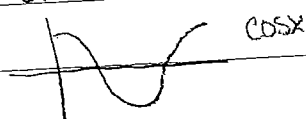


$$y = -\cos x - 3$$



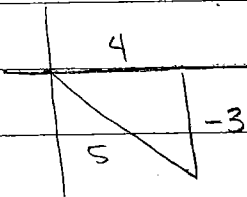
Reflect over x

down 3



Semester 2 Review Day 2 (cont'd)

28



$$(-3)^2 + x^2 = 5^2$$

$$9 + x^2 = 25$$

$$x^2 = 16$$

$$x = 4$$

$$\cos \theta = \frac{4}{5}$$

$$\tan \theta = -\frac{3}{4}$$

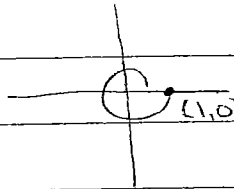
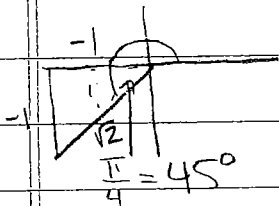
$$\sec \theta = \frac{5}{4}$$

$$\csc \theta = \frac{5}{3}$$

$$\cot \theta = -\frac{4}{3}$$

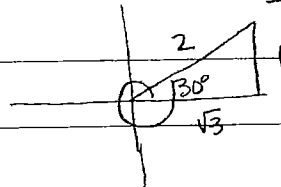
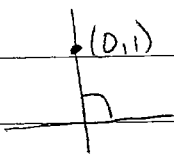
29. $\csc \frac{5\pi}{4} = \boxed{-\sqrt{2}}$

$\cos 2\pi = \boxed{1}$



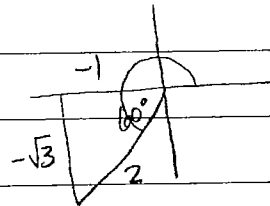
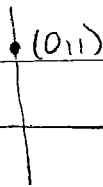
$\sec \frac{\pi}{2} = \frac{1}{0} = \boxed{\text{undefined}}$

$\cot 390^\circ = \boxed{\sqrt{3}}$



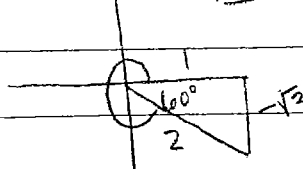
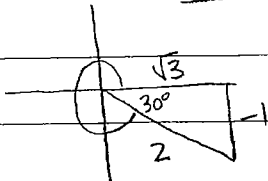
$\tan 90^\circ = \frac{1}{0} = \boxed{\text{undefined}}$

$\sin 240^\circ = \boxed{-\frac{\sqrt{3}}{2}}$



$\sin \frac{11\pi}{6} = \boxed{-\frac{1}{2}}$

$\cot \frac{5\pi}{3} = \boxed{-\frac{\sqrt{3}}{3}}$



Degrees \rightarrow Radians
multiply by $\frac{\pi}{180}$

Radians \rightarrow Degrees
multiply by $\frac{180}{\pi}$

$$24. \quad 240 \cdot \frac{\pi}{180} = \boxed{\frac{4\pi}{3}}$$

$$25. \quad \frac{\pi}{4} \cdot \frac{180}{\pi} = \boxed{45^\circ}$$

26. Arc length = radius \cdot angle in radians

$$s = r\theta$$

$$s = 10 \cdot \frac{3\pi}{5}$$

$$= \boxed{6\pi \text{ m}}$$

27. linear speed = $\frac{\text{arc length}}{\text{time}}$

$$v = \frac{r\theta}{t}$$

diameter = 10 ft.

$\theta = 15$ radians
sec

$$v = 5 \text{ ft} \cdot \frac{15 \text{ rad}}{\text{sec}} = \frac{75 \text{ ft}}{\text{sec}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

$$= \frac{75 \cdot 60 \cdot 60}{5280}$$

$$= \boxed{51.136 \text{ mph}}$$

angular speed = $\frac{\text{angle in radians}}{\text{time}}$

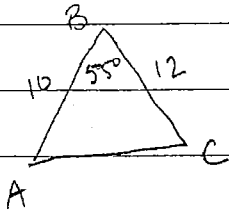
1 hour = 1 rotation = 2π radians

1 hour = 60 seconds

$$\frac{2\pi \cdot 60}{120\pi} \frac{\text{radians}}{\text{hr}}$$

Semester 2 Day 2 (cont'd)

32.



$$A = \frac{1}{2} (10)(12) \sin 55$$

$$= \boxed{49.149}$$

33.

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

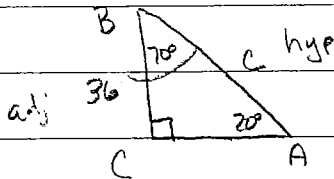
34.

$$\angle C = 90^\circ$$

$$\angle B = 70^\circ$$

$$a = 36$$

$$\boxed{c = 105.257}$$



$$\cos 70 = \frac{36}{c}$$

$$\underline{c \cos 70 = 36}$$

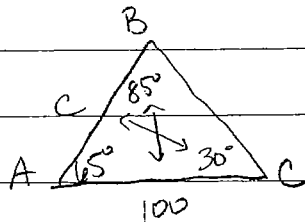
$$\cos 70 \quad \cos 70$$

$$\angle A = 65^\circ$$

$$\angle B = 85^\circ$$

$$b = 100$$

$$\boxed{c = 50.191}$$



$$\frac{c}{\sin 30} = \frac{100}{\sin 85}$$

$$\underline{c \sin 85 = 100 \sin 30}$$

$$\frac{\sin 85}{\sin 85}$$

$$\boxed{c = 50.191}$$

$$65 + 85 + C = 180$$

$$150 + C = 180$$

$$C = 30$$

c) $r = -.928$

r is close to -1 , signifying a strong, negative correlation

d) $r^2 = .862$

86% of the data can be explained by x

e) $y = \frac{-.78125(27) + 9.1875}{|-11.906|}$

Calc: r and r^2 are in the list with LinReg
 If r and r^2 do not show up in your list
 you need to turn on the diagnostic
 [2nd] [0] (catalog) scroll to Diagnostic On [Enter]

$x = z\sigma + \mu$

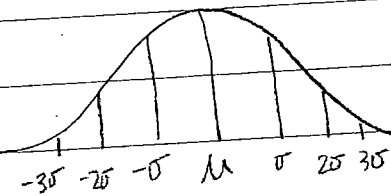
$z = \frac{x - \mu}{\sigma}$

μ = Mean

σ = Standard deviation

z = z-score

x = raw score

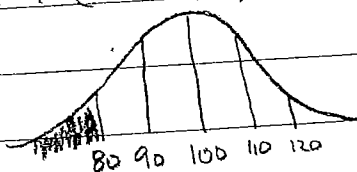


* z-chart shows areas (probability) to the left of z

13. a) $P(x \leq 80)$

$\sigma = 10$

$z = \frac{80 - 100}{10} = -2$



z-chart $c - 2.0 = .0228$

$P(x \leq 80) = \boxed{2.28\%}$

Semester 2 Review Day 2 (cont'd)

$$39. \quad 36 + 18 + 9 + \frac{9}{2} + \frac{9}{4} \quad r = \frac{1}{2} \quad \text{yes} \quad \frac{1}{2} < 1$$

$$\frac{1}{2} + \frac{4}{6} + \frac{16}{18} + \frac{64}{54} \quad r = \frac{4}{3} \quad \text{no} \quad \frac{4}{3} > 1$$

$$40. \quad S_{\infty} = \frac{a_1}{1-r} \quad r = \frac{1}{2} \\ a_1 = 36$$

$$S_{\infty} = \frac{36}{1 - \frac{1}{2}} \\ = \frac{36}{\frac{1}{2}} \\ = \boxed{72}$$

