F.S.T.
2nd Semester Review

Name: _____
Block: _____

Non-Calculator

Solve each problem. Show your work. If you need to refer to your textbook, the section is listed in ( ).

(1-3) 1. Multiple choice The stemplot below shows a set of test scores.

5	0 2 5 9
6	1 3 3 8 9
7	0 0 0 2 6
8	0 1 3 7
9	0 1 2 4
10	0 0

What is the mode of the scores?
A) 74.9 B) 70 C) 72 D) 100

(1-3) 2. Multiple choice Use the stemplot to answer the question below it. The stemplot lists the hourly wages.

5.00	5 5
5.10	0 2 5 8
5.20	5
5.30	0 0 0 2 5
5.40	0 3
5.50	0 5 9
5.60	1 5

Which expression represents the mean weekly wage, if the employee works 12 hours per week?
A) $\frac{12}{19}\sum_{i=1}^{19} w_i$ B) $\frac{19}{12}\sum_{i=1}^{19} w_i$ C) $19\sum_{i=1}^{12} w_i$ D) $12\sum_{i=1}^{19} w_i$

(1-3) 3. Which measure of center must be a member of the data set?

(1-7) 4. Let $a_1 = 1$, $a_2 = 3$, $a_3 = 5$, $a_4 = 5$, $a_5 = 8$, $a_6 = 9$, and $a_7 = 11$. Evaluate:
a. the mean
b. the variance
c. the standard deviation

(1-4) 5. The table shows the twenty United States corporations with the greatest revenues in 1993, as reported in the *Fortune 500* list.

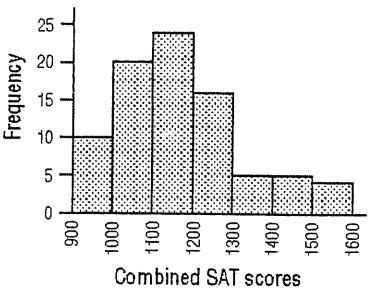
Rank	Company	Revenues ($billions)	Rank	Company	Revenues ($billions)
1	General Motors	134	11	Chevron	32
2	Ford Motor	109	12	Proctor & Gamble	30
3	Exxon	98	13	Amoco	25
4	IBM	63	14	Boeing	25
5	General Electric	61	15	PepsiCo	25
6	Mobil	57	16	Conagra	22
7	Philip Morris	51	17	Shell Oil	21
8	Chrysler	44	18	United Technologies	21
9	Texaco	34	19	Hewlett-Packard	20
10	DuPont	33	20	Eastman Kodak	20

For the revenues of the companies above,

a. Give the five number summary for the data.
b. Find any outliers.
c. What is PepsiCo's percentile ranking among the companies?
d. Draw a box plot for this data.

(1-5) 6. The histogram below shows the SAT scores of a high school graduating class. Each interval includes the left endpoint, but not the right.

a. About what percent of the students scored 1099 or less?
b. In which interval is the third quartile?



(1-6) 7. Name the best type of display for each criteria.

a. How the measurement of a certain event or quantity changes over time.
b. The frequency of each data value in numerical set of data.
c. What percentage each group of data is in relation to the entire data set.

(3-3) 8. Thirty members of a hiking club were asked to set a goal of walking an additional 10 miles per week. Their mileage statistics at the outset of the program are described in the Initial Miles column of the table below. Complete the Target Miles Column.

Statistical Measure	Initial Miles/Week	Target Miles/Week
Mean	**a**	46.7
Median	40.0	**b**
Range	**c**	29.0
Mode	42.0	**d**
St. Dev.	22.4	**e**

(3-6) 9. True or false. If a data set undergoes a scale change with scale factor 4, the mean is changed by a factor of $\frac{1}{4}$.

(7-4) 10. Evaluate ${}_{12}P_4$.

(7-2) 11. Multiple choice. A collection of 45 baseball cards contains 35 pitchers and 18 Hall of Famer cards. How many Hall of Fame pitchers are included in this collection?

A) cannot be determined from the given information
B) 32
C) 18
D) 8

(7-5) 12. A fair coin is tossed twice. Which, if any, of the events below are independent?

X is the event that the number of tails is odd.
Y is the event that the first toss is a head.
Z is the event that the number of tails is even.

(7-5) 13. In each of the following, identify the events as independent, mutually exclusive, complimentary, or none of these.

a. E_1 : being a member of the swim team
E_2 : being a member of the chess club.

b. E_1 : getting first prize in a contest
E_2 : getting second prize in a contest.

c. E_1 : voting in a presidential election.
E_2 : not voting in a presidential election.

(4-1) 14. Fill in the blanks below.

Equivalent Measures of Rotations		
Degrees	Radians (Exact)	Revolutions
108°	a.	b.
c.	$-\frac{5\pi}{3}$	d.
e.	f.	$-\frac{5}{2}$
g.	$\frac{49\pi}{12}$	h.

(4-3) 15. In what interval(s) between 0 and 2π are $\tan\theta$ and $\cos\theta$ both negative? both positive?

(4-9) 16. Identify each of the following for the function with equation $y = 2\cos\left(\frac{x}{6} + \frac{\pi}{3}\right) + 4$

a. domain
b. range
c. amplitude
d. period
e. phase shift
f. vertical shift
g. graph the function

(4-4) 17. Suppose $\sin\theta = 0.72$. Evaluate.

a. $\cos\left(\frac{\pi}{2} - \theta\right)$
b. $\sin(\pi + \theta)$
c. $\sin(\pi - \theta)$
d. $\sin(-\theta)$

(4-3) 18. Give exact values for each.
(4-5)

a. $\sin\left(\frac{3\pi}{2}\right)$

b. $\cos\left(-\frac{4\pi}{3}\right)$

c. $\tan\left(\frac{\pi}{6}\right)$

d. $\cos 225^\circ$

(4-9) 19. Suppose the following transformations are applied to the graph of y = sin x. State the equation for each image.

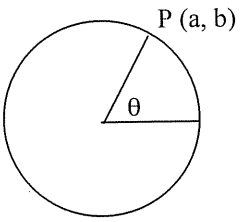
a. $T(x,y) \rightarrow \left(x + \frac{\pi}{3}, y - 1\right)$
b. $S(x,y) \rightarrow \left(\frac{x}{4}, 7y\right)$

(4-9) 20. Write an equation for a function whose parent is y = cos x and that has phase shift $\frac{\pi}{4}$ from the parent, period π, vertical shift of 17, and amplitude 5.

(4-9) 21. Identify each of the following for the function with equation $y = 4\sin(2x - \pi) - 3$.

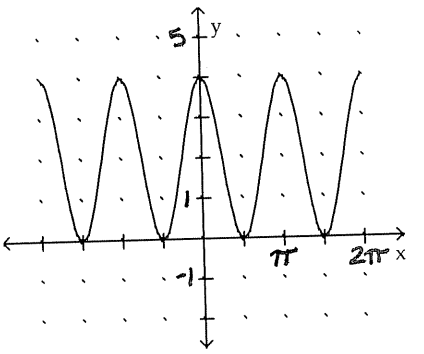
a. domain
b. range
c. amplitude
d. period
e. phase shift
f. vertical shift
g. graph the function

(4-4) 22. Use the unit circle to the right. State each value.



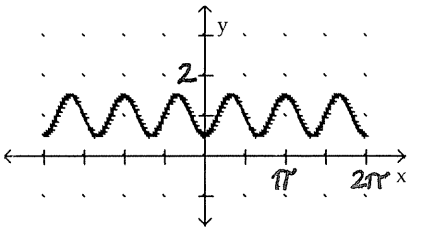
a. $\tan(\pi+\theta)$
b. $\sin(\pi-\theta)$

(4-9) 23. Below and right is a graph together with a general form of an equation for it. Find each value in the equation.



a. amplitude
b. period
c. phase shift
d. vertical shift
e. Write the equation of the given graph.

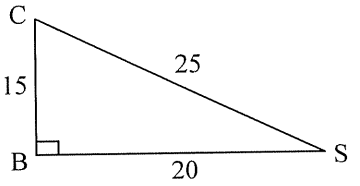
(4-9) 24. Below and right is a graph together with a general form of an equation for it. Find each value in the equation.



a. amplitude
b. period
c. phase shift
d. vertical shift
e. Write the equation of the given graph.

(5-1) 25. Using ΔCBS

a. Find $\tan S$ exactly.
b. Find $\cos S$ exactly.
c. Find $\sin C$ exactly.



(5-5) 26. Find the exact value of $\sin^{-1}\left(\frac{1}{2}\right)$ in radians.

(5-3) 27. Find the exact value of $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$ in radians.

(5-6) 28. Find the exact value of $\tan^{-1}(\sqrt{3})$ in radians.

(5-3) 29. <u>Multiple choice.</u> $\cos^{-1}\left(\cos\frac{11\pi}{6}\right) = ?$

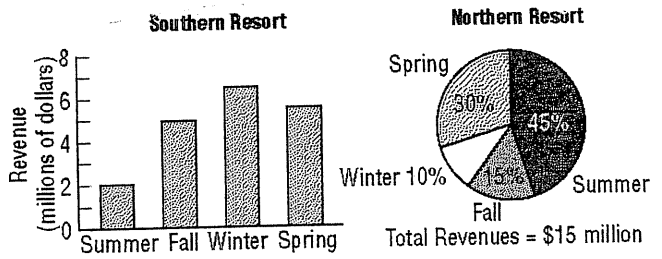
A. $-\frac{11\pi}{6}$ B. $\frac{11\pi}{6}$ C. $-\frac{7\pi}{6}$ D. $\frac{\pi}{6}$

Calculator Allowed

(1-1) 30. A producer's daily output is 1,500 quarts of ice cream. An inspector selects twelve of these quarts and measures the butterfat contents of scoop of ice cream from each.

a. Identify the sample and the population.
b. What percent of the population does the sample represent?
c. What is the variable of interest?
d. Give a reason for testing only a sample.

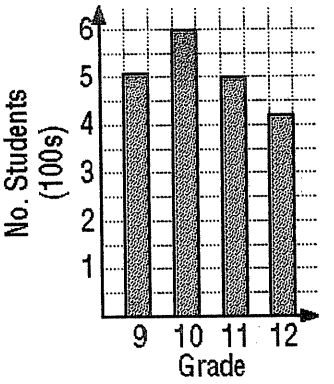
(1-6) 31. The bar graph below shows the distribution of last year's revenues by season for a southern resort. The circle graph shows the corresponding distribution for a northern resort.



a. By how many dollars did the southern resort's total annual revenues exceed those of the northern resort.
b. In what season(s) did the northern resort have greater revenues?

(1-6) 32. Multiple Choice. Refer to the bar chart at the right, which shows the number of students in each grade at high school. If the data are to be displayed in a pie chart, what should be the measure of the central angle of the sector for the 9th grade?

A) 25^o B) 89^o C) 104^o D) 50^o

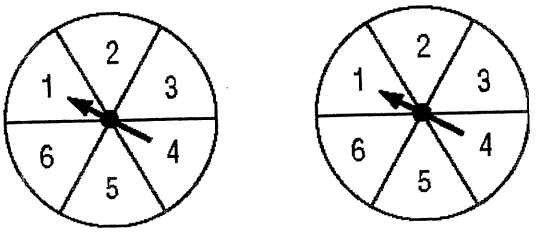


(3-9) 33. Suppose the mean score on a test is 73 and the standard deviation is 14. What is the z-score for a raw score of 100 on this test?

(3-9) 34. Last week, Carol took two tests: a geography test and a spelling test. Carol's raw score for the geography test was 121 points. The mean for the geography test was 97 points and the standard deviation was 6 points. Carol's raw score for the spelling test was 39 points. The mean for the spelling test was 38, and the standard deviation was 4 points.

a. Find Carol's z-scores for the geography and spelling tests.
b. On which test did Carol do better compared to other students?

(7-1) 35. Assume that each of the two spinners below is equally likely to land in each of the six regions.



a. How many outcomes are there in the sample space for spinning both spinners?
b. What is the probability that the sum of the two spinners is equal to 8?

(7-2) 36. What is the probability that a sum of 10 occurs when two fair dice are tossed?

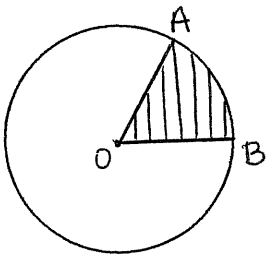
(7-4) 37. How many permutations of four letters long can be formed from the word COMPUTERS?

(7-4) 38. Solve for n: $(n-1)!=30(n-3)!$

(7-3) 39. A garden shop sells six colors of petunias, five colors of marigolds, three colors of tiger lilies, and four colors of sweet william. If you want to choose one color from each of the four kinds of flowers, how many different bouquets can you make?

(4-2) 40. In a circle of diameter 18 inches, a sector is formed by a central angle of 110°. Find the area of the sector to the nearest tenth of a square inch. Then, find the length of the arc on the edge of this sector.

(4-2) 41. The radius of circle O below is 4 feet. The area of the shaded sector is 8π square feet. Compute each of the following exactly.



a. $m\angle AOB$ in radians.
b. the length of AB.

(4-4) 42. Suppose $\sin\theta = 0.87$. Find $\cos\theta$. Round your answer to the nearest hundredth.

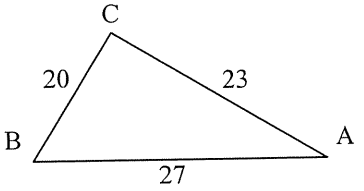
(5-1) 43. A ramp needs to be installed at the edge of some stairs to the front porch of a house. If the porch is 27 inches higher than the sidewalk, and the angle of elevation can be no more that 5.2°, what is the shortest length, to the nearest foot, the ramp needs to be?

(5-1) 44. A ladder that is 19 feet long rests against a wall so that the bottom of the ladder is 9 feet from the wall. What is the measure of the angle formed by the ladder and the floor? Round your answer to the nearest degree.

(5-2) 45. Multiple Choice. The measure of the angle where tow roads intersect is $80°$. The roads are also joined by a connecting road at junctions that are 8 miles and 20 miles from the intersection. About what is the length of the connecting road?

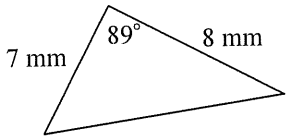
A. 24.93 mi. B. 21.54 mi. C. 17.51 mi. D. 20.21 mi.

(5-2) 46. Solve ΔABC. Round your answers to the nearest tenth.



(5-2) 47. In ΔXYZ, $x = 2.7$, $m\angle X = 50°$ and $m\angle Z = 32°$. Solve the triangle. Round your answers to the nearest tenth.

(5-4) 48. Find the area of the triangle below. Round your answer to the nearest tenth square mm.



(5-4) 49. In ΔABC, $m\angle A = 47°$, $a = 34$, and $b = 42$. Find all possible values of $m\angle B$ to the nearest tenth.

(5-4) 50. In ΔXYZ, $m\angle X = 62°$, $x = 7$, and $z = 10$. Find all possible values of $m\angle Z$ to the nearest tenth of a degree.