

FINAL EXAM M100 Summer 2008 PRACTICE

You may use a calculator.

You may use one 8.5 x 5.5 sheet of paper (half of a sheet of standard notebook) that contains notes and formulas.

Last week material is colored blue (do not attempt to solve before Monday-June23th)

Scores on a biology quiz	Frequency
5	2
6	6
7	12
8	14
9	6
10	4

1. Find the mean for the quiz scores shown in the table to the right:

2. The amount of time customer spend waiting in line at a bank is normally distributed, with a mean of 2.5 minutes and a standard deviation of 0.7 minute. Find probability that the time a customer spends waiting is 1.1 minutes to 2.5 minutes.

3. Find the mean, median, range, and standard deviation for the given data 1,5,7,1

4. The weights of 7000 boxes of corn flakes filled by a machine are normally distributed, with an average weight of 14.5 ounces and standard deviation of 0.4 ounce. What percentage of boxes weight more than 15.2 ounces?

5. A highway study of 8000 vehicles that passed by a checkpoint found that their speeds were normally distributed, with a mean of 61 mph and standard deviation of 7 mph. What percentage of vehicles had a speed of less than 68mph? How many vehicles had a speed of less than 68mph?

6. A single die is rolled twice. What is the probability of getting the same number twice (a double)?

7. A group of 10 students must select a president, a vice-president, a secretary, and a treasurer. In how many possible ways can this be accomplished?

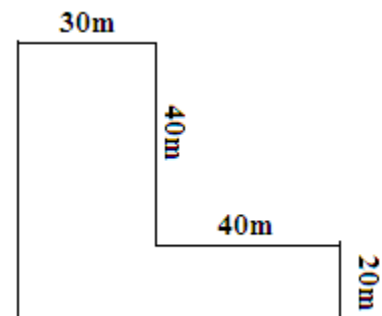
8. Convert using dimensional analysis where appropriate

- A) $-40^{\circ}C$ to $^{\circ}F$ B) 460 kg to lb C) 14 in to cm
 D) 50 m to ft E) 38 yd^2 to m^2

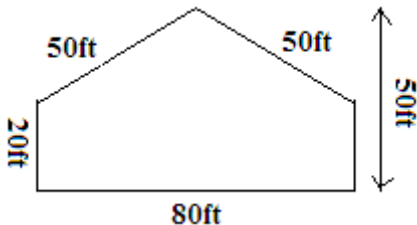
9. Express 65 miles per hour in kilometers per hour. Express it also in meters per second.

10. For each kilogram of a person's weight 4 milligrams of a drug is to be given. What dosage should be given to a 150 pounds lady? What is the weight (in pounds) of a person that receives 200 mg of this drug?

11. A school playground is in the shape shown. If fencing costs \$14 per meter, what will it cost to place fencing around the playground? What is the area of the playground?



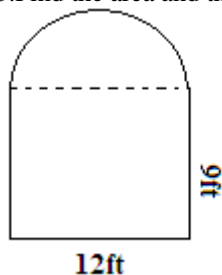
12. Find the area and the perimeter of the figure below



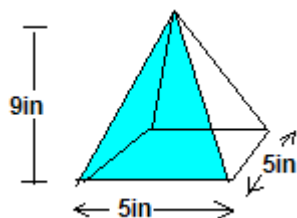
13. How many different secret codes can be formed by using two letters of English alphabet followed by 3 digits?

14. How many different secret codes can be formed by using two letters of English alphabet followed by 3 digits if no digit nor letter can be repeated?

15. Find the area and the perimeter of the following figure.



16. Find volume of



17. In how many distinct ways can the letters of the word "MISSISSIPPI" be arranged?

18. Find the surface area and the volume of a cylindrical can whose diameter is 10 cm and the height is 8 cm.

19. A multiple choice test has 10 questions. Each of the questions has five choices. In how many different ways can you fill in this test if you select exactly one answer for each question?

20. You own a small antique shop. You collected the following information on your customers last year.

	Spent less than \$500	Spent \$500 or more
male	25	35
female	400	190

One of these customers is selected at random. What is the probability that this customer is female?

21. Find the exact number of possible ways to complete a true-false test consisting of 15 questions.

22. If the odds are 4:3 that Judy will win race, find probability of winning

23. If you toss seven fair coins, in how many ways can you obtain at least one head ("At least one" is the complement of "none")

24. An athletic shoe store sells jogging shoes in three styles that come in four colors. Each color comes in six sizes. How many distinct shoes are available?

25. Total of 89 people came to a party. There were 29 more children than adults. Use algebraic equation to find out how many adults came?

26. A total of 373 people came to Maria Sanders cello concert. Floor tickets cost \$25 each, while balcony tickets cost \$15 each. If a total of \$8,115 was collected, how many of each type of ticket were sold?

27. Create equation(s) and solve: The distance that the sky divers fall varies directly as the square of the time in which they fall. The sky divers fall 64ft in 2 seconds. How far will they fall in 5 seconds?

28. Simplify $\frac{m^{-2}n^{-5}}{(m^2)^{-3}n}$

29. Convert to scientific notation a) 456000 b) 0.00000763

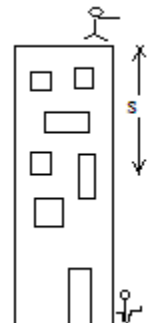
30. Solve $x^2 = 32$

31. Solve: $5x^2 = -29x + 6$

32. Solve: $2x^2 - 4x = 1$

33. The equation $s = 16t^2 + 15t$ gives the distance s in feet an object thrown off a building has descended in t seconds (see picture to the right).

- a) How far away will the object be after 2 seconds?
 b) Find the time t when the object has descended 25 ft.



34. Find slope of the line passing points $(-2, -4)$ and $(1, -8)$

35. Give x and y intercepts and graph $3x - 4y = -48$

36. Write the slope-intercept form of the equation of the line through $(-1, 6)$ with slope 8.

37. State slope and y -intercept of line: $7x - 3y = -24$

38. Let $H(x) = 10 - 3x - x^2$. Find $H(-2)$

39. Find the domain of function $f(x) = \frac{3-x}{x-5}$

40. When a forensic scientist finds some human bones but not the entire skeleton, a man's height is determined using function $H(t) = 81.69 + 2.39t$, where t stands for the length of the tibia in centimeters (the bone from the ankle to the knee).

- a) Find the height of a man with a tibia measuring 38 centimeters.
 b) How long is tibia of a man whose height is 198cm (like Michael Jordan)

41. Graph $f(x) = -x^2 + 4x - 1$

42. Doctors noticed that for a patient with high fever function $T(x) = 0.52x^2 - 3.39x + 43$ gives body temperature in Celsius x hours after taking Mayenol. Here $0 \leq x \leq 7$.

- a) When will the body temperature be minimal?
 b) What is the minimal body temperature?

43. Table shows life expectancy and infant deaths rate in 4 different countries..

	US	Brazil	Bangladesh	Japan
x-life expectancy in years	76	64	57	80
y- infant deaths per 1,000 births	6.4	40	98	4.1

Using formulas for the least squares line determines the linear model that describes this trend and can be used to approximate the number of infant deaths per 1,000 births given the life expectancy for a country..

44. More people are staying single longer in the US. The number of never married adults (in millions) can be approximated with the function $A(x) = 0.73x + 38$, where x stands for number of years after 1970 ($x = 0$ in year 1970, $x = 1$ in year 1971, and so on). Use the function to calculate the year when the number of cohabiting adults will exceed 65 million.

45. A pool is treated with a chemical to reduce the number of algae. The number of algae in the pool x days after treatment is $A(x) = 35x^2 - 490x + 5320$.

- a) How many days after treatment will the pool have the least number of algae?
 b) Find the minimal number of algae.

46. Three Margaritas and five Mojitos cost \$41.10. If you buy one of each, your bill will be \$9.90. What is the price of each?

47. In general, the larger a state's population, the more its governor earns. Listed below are the estimated 1998 populations (in millions) and the salary of the governor (in thousands of dollars) for 5 randomly selected states (source The New York Times 2000 almanac)

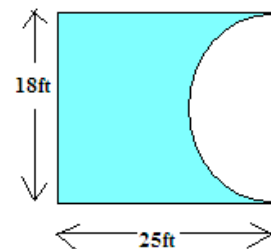
State	AZ	MA	NY	PA	TN
Population(x)	4.67	6.15	18.18	12	5.43
Salary(y)	75	75	130	105	85

Using formulas for the least squares line determines the linear model that describes this trend and can be used to approximate the Indiana governor salary in 1998 given the state population of 5.9 million. Find the coefficient of correlation?

48. Convert:

- A) 14 in. to cm B) 45 cm to ft C) 40 m² to yd² D) 55 km/h to mph
 E) 40 ft² to cm² F) 586 lb to kg G) 3889 cm to m

49. To estimate the amount of protective paint needed to cover wooden deck Jonah measured dimensions and made the drawing shown to the right. Find the area of the deck (shaded area on the picture is the deck).



50. Ryan is a high jumper. He jumped 6 ft and 3 in during competition where the usual mean is 6 ft and the standard deviation is 3.5 in. his cousin Michelle achieved 18 ft 4 in in long jump, while the mean is 16 ft 6 in and the standard deviation is 1 ft 10 in for this event. Compare their z-scores to decide who will celebrate more.

51. $U = \{0,1,2,3,4,5,6,7,8,9\}$ $A = \{2,4,6\}$ $B = \{1,2,3,4,5,6\}$ $C = \{6,7,8,9\}$ $D = \{5,7,9\}$ Find

- a) A' b) $D \cup E$ c) $(B \cap C)'$ d) $B' \cap C'$ e) how many subsets B has? f) List all subsets of A g) $A \times D$

52. We know the following about the first 42 presidents of the United States:

8 held a cabinet post; 14 served as vice-president; 15 served in the U.S Senate; 2 served in a cabinet post and as vice-president; 4 served in a cabinet post and in the U.S. Senate; 6 served in the U.S. Senate and as vice-president; 1 serves in all three positions.

Create a Venn diagram and answer the following questions:

- How many served in none of these positions?
- How many served in only the U.S. Senate?
- How many served in at least one of the three positions?
- How many served in exactly two positions?

Practice Problems: Some Answers

1. 7.64 2. 0.475 3. mean is 3.5, median is 3, range is 6, standard deviation is 3 4. 3.59 %
 5. 84% of vehicle. The number of vehicles is 6720 6. 1/6 7. 5040
 8. (A) $-40^{\circ}F$ (B) 1012lb (C) 35.56cm (D) 164.04ft (E) 31.7728m² 9. 28.89m/s
 10. 110lb 11. Cost is \$3640 Area is 2600 m² 12. area is 2800 ft², perimeter is 220 ft 13. 676000
 14. 468000 15. area 164.52 ft² perimeter 48.84 ft 16. .75 in³ 17. 34650 18. Volume is 628 cm³
 19. 9765625 20. 59 / 65 21. 32768 22. 4/7 23. 127 24. 72 25. 30 adults and 59 ch. 26. 252 floor, 121 balc
 27. $d = 16t^2$, 400ft 31. $\left\{\frac{1}{5}, -6\right\}$ 32. $\left\{\frac{2+\sqrt{6}}{2}, \frac{2-\sqrt{6}}{2}\right\}$
 41) see picture to the right
 42. a) 3.26h b) 37.5C 43. $y = -3.9062x + 307.63$
 44. 2007 45. a) 7 b) 3605 46. Margarita \$420, Mojito \$5.70
 47. $y = 4.0159x + 56.708$, salary \$80,402, $r \approx 0.981$ 49 $\approx 322.7655\text{ft}^2$ 50. Michelle since $z=1 > 0.86$

