Mathematics Department
New York City College of Technology
City University of New York

Dr. R. Noll
Fall 2007
Revised: Niezgoda, Carley **(Fall08)**

REVIEW SHEET – FINAL EXAM – MAT 1180

1. List the numbers in the set $\{-7,\ \sqrt{3}\ , -\frac{9}{5}\ , -.3,\ 0,\ 3,\ 7.4\}$ that are:

a) natural numbers _____ **b)** rational numbers _____
c) irrational numbers _____ **d)** Graph the numbers on a number line.

2. Perform the indicated operations, using the order of operations:

a) $24 \div (-6) \div (-2) =$ **b)** $\dfrac{3(7-5)+(-3)(-4)}{2^3+1^3} =$

3. Convert each rational number into a repeating or terminating decimal:

a) $\frac{4}{15}$ **b)** $\frac{9}{40}$ **c)** $\frac{7}{25}$ **d)** $\frac{3}{11}$

4. Evaluate:

a) $(-6)^3$ **b)** $\left(\frac{4}{3}\right)^{-2}$ **c)** $(-8)^0$ **b)** $2^{-3}2^5$ **d)** $3^{-1}+6-1$

5. Rationalize: a) $\frac{4}{\sqrt{2}}$ **b)** $\frac{2\sqrt{3}}{\sqrt{7}}$ Simplify: **c)** $\sqrt{8}+\sqrt{98}-\sqrt{32}$ **d)** $2\sqrt{27}-\sqrt{300}$

6. **a)** Write in standard form: 6.59×10^3 **b)** Use scientific notation to evaluate:

$$\frac{(2{,}500{,}000)(.000000081)}{(6000)(.0000025)}$$

7. Solve each of the following word problems:

a) A man invested $6,000, part of it at 5% simple interest and the rest at 7% simple interest. If his annual interest income is $372, how much did he invest at each rate?

b) In a pre-election poll of 480 voters, 260 favored candidate Harrison. How many votes should Harrison expect, if 12,000 are expected to vote?

c) Find 18% of 3200.

d) If an item normally sells for $50 and is to be discounted 10%, what is the discount price?

e) At a club's bake sale, they had $16.50 in dimes and quarters. If there were 96 coins in all, how many of each coin did they have?

f) If a car travels 80 miles on 5 gal. of gas, how many gallons will it take to travel 148 miles?

g) On his first two tests, John scored 85 and 89. What score must he make on his third test in order to have an average of at least 91?

8. For each kilogram of a person's weight, 15 milligrams of a drug is to be given. What dosage should be given to a person who weighs 150 lbs? (use the fact that 1 lb=0.45 kg)

9. Solve each of the following equations:

a) $2(3 - y) = 3y + 1$ **b)** Solve for r: $I = \frac{prD}{365}$ **c)** $\frac{3}{2}x - 7 = 2x + 3$

d) $\frac{x}{3} + \frac{x-6}{5} = \frac{2}{5}$ **e)** $.09n + .13(n + 300) = 61$ **f)** Solve for b: $P = 20a + b$

10. For each of the following, solve then graph your results, and give the answer in interval notation:

a) $3(n - 1) > 5n + 7$ **b)** $-3 < 4c + 5 \leq 1$ **c)** $2r - 4(r + 7) \geq 3r + 2$

d) $-\frac{m}{2} < -2$ **e)** $-2(x + 4) \leq 6x + 8$ **f)** $-8 \leq \frac{3y+1}{4} \leq 7$

11. Solve the following systems of equations:

a) $2x - 7y = 10$, $5x - 6y = 2$ **b)** $y = 4x$, $x + y = 10$ **c)** $x + 3y = 3$, $3x - 2y = -13$ **d)** $x - 3y = 2$, $2x - 5y = 2$

12. Graph the solution for each system of inequalities:

a) $y \leq 2$, $y \geq x$ **b)** $x + y > 0$, $x - y \leq 0$ **c)** $3x \leq 6-2y$, $2x + 3y \geq 6$ **d)** $2x - y < 3$, $x + y \geq 0$

13. Find the area of a parallelogram with height 20 inches and base 25 inches.

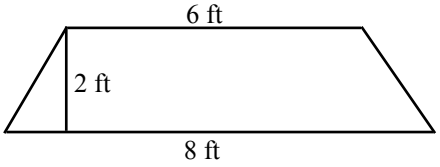
14. If a triangle has a height of 20 inches and a base of 25 inches, find its area.

15. Find the perimeter of a triangle with sides 2 mm, 4 mm, and a base 2.5 mm.

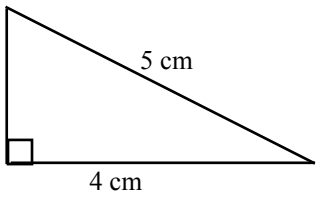
16. Given a circle with a diameter of .4 cm, find its circumference.

For questions 17 – 19: Find the area of each figure:

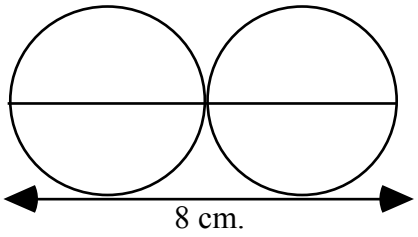
17.



18.

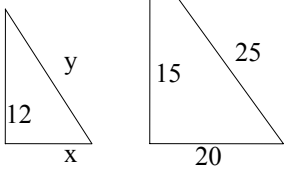


19.

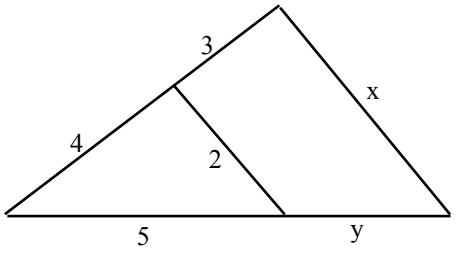


20. – 21. Find the unknown lengths in each pair of similar triangles:

20.



21.



22. On a map, the distance from Parma to Wadsworth is 3.5 inches. If 5 inches on the map represents 17 miles, how far is it actually from Parma to Wadsworth?

23. A right triangle measures 3.5 cm on its shortest side. If the hypotenuse is 12.5 cm, how many cm is the measure of the medium side?

24. The hypotenuse of a right triangle is 4 meters more than the length of the longer leg. The shorter leg is 20 meters. Find the length of the longer leg.

25. Burt is buying a new bike. He has a choice of 3 models and 4 colors. How many different bikes does Burt have to choose from?

26. In a certain class, there a 4 students in the first row, 3 girls: Ann, Barbara, and Cathy and 1 boy: David. The teacher called one student to do the first problem and then called one of the other students to do the second problem. What is the sample space?

27. One card is to be selected at random from a deck of 52-cards. Find the probability that the card selected is: **a)** a 3 **b)** a spade **c)** a heart or a club **d)** not a 3

28. A package of flower seeds contains 100 seeds of white flowers, 50 seeds of red flowers, 25 seeds of pink, and 25 seeds of blue. Find the probability a seed chosen at random will produce:
a) a red flower **b)** a white or red or pink or blue **c)** What are the odds it is a red flower?

29. A bag contains 2 red, 4 yellow, and 6 blue marbles. Two marbles are drawn at random without replacement. Find the probability that: **a)** both are red; **b)** both are yellow; **c)** both are blue; **d)** one is red and one is yellow; **e)** neither is red; **f)** neither is blue.

30. Two cards are drawn from a standard deck with replacement. Find the probability of each of the following events:
a) Both are 8s.
b) The first is red, and the second is black.
c) The second is a king, given that the first was a king.
d) The first is an ace, and the second is not.
e) Neither one is a club.

31. Repeat question 36, but this time without replacement.

32. Draw a frequency polygon to represent the following data: 2, 4, 6, 6, 4, 3.

33. Consider the following data: 13, 16, 1, 22, 8, 9, 20, 23, 15, 4, 6, 15, 16, 18, 22.
a) Complete the following grouped frequency table for the above distribution.

Interval	Frequency
1–6	_____
7–12	_____
13–18	_____
19–24	_____

b) Use the results in part a) to draw a histogram.

34. For the following set of data, calculate **(a)** the mean, **(b)** the median, and **(c)** the mode. If necessary round the values to the nearest tenth.
14, 9, 8, 15, 8, 8, 17

35. Find the range and standard deviation for the following samples:
a) 10, 19, 23, 36, 31, 13
b) 42, 46, 50, 52, 54, 56

36. Assume the amount of coffee dispensed by a vending machine is normally distributed with a mean of 7 ounces and a standard deviation of .5 ounces. Assuming a normal distribution, find the percent of times that the machine will dispense the following amounts:
a) less than 6 ounces **b)** more than 7.5 ounces **c)** between 6.5 and 8 ounces

37. The mean weight of a loaf of bread was found by sampling to be 455 g, with a standard deviation of 5 g. Assuming a normal distribution, find the percent of loaves with weights that are:
a) less than 450 g **b)** greater than 445 g **c)** greater than 470 g **d)** between 450 and 460 g

38. The table below, relates the number of years students have studied math in high school or college (x) and the scores each received on a proficiency test (y).

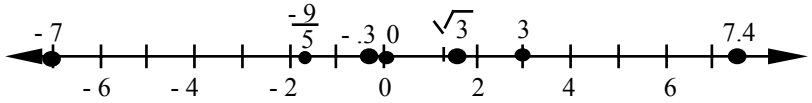
Year (x)	2	3	4	4	3
Score (y)	48	75	70	75	60

a) Plot a scatter diagram:

b) The correlation coefficient for the above data is .81. Use the table with α=.05 to determine whether there is a correlation in the population. Justify your answer.

MAT 1180 FINAL EXAM REVIEW ANSWER:

1. a) 3 **b)** $-7, -\frac{9}{5}, -.3, 0, 3, 7.4$ **c)** $\sqrt{3}$ **d)**



2. a) 2 **b)** 2 **3. a)** $.2\overline{6}$ **b)** .225 **c)** .28 **d)** $.\overline{27}$

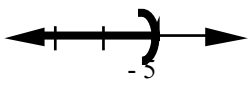
4. a) – 216 **b)** $\frac{9}{16}$ **c)** 1 **d)** $\frac{1}{2}$

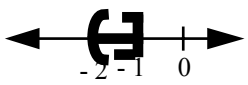
5. a) $2\sqrt{2}$ **b)** $\frac{2\sqrt{21}}{7}$ **c)** $5\sqrt{2}$ **d)** $-4\sqrt{3}$ **6. a)** 6,590 **b)** 1.35×10^1

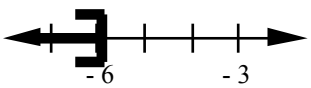
7. a) 5% invest. = \$2,400; 7% invest. = \$3,600 **b)** 6,500 votes **c)** 576 **d)** \$45 **e)** 46 quarters; 50 dimes **f)** 9.25 gal. **g)** 99

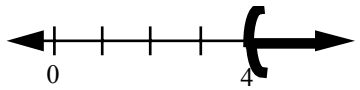
8. 1012.5mg

9. a) y = 1 **b)** $r = \frac{365I}{pD}$ **c)** x = – 20 **d)** x = 3 **e)** n = 100 **f)** b = P – 20a

10. a) $n < -5$ $(-\infty, -5)$ 

b) $-2 < c \leq -1$ $(-2, -1]$ 

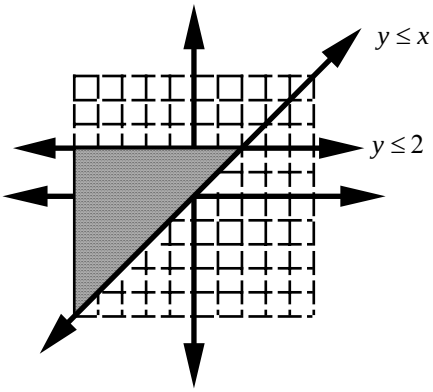
c) $r \leq -6$ $(-\infty, -6]$ 

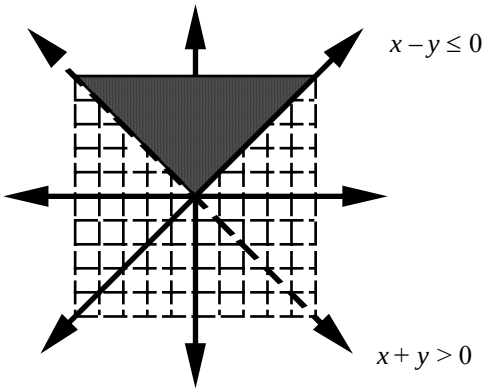
d) $m > 4$ $(4, \infty)$ 

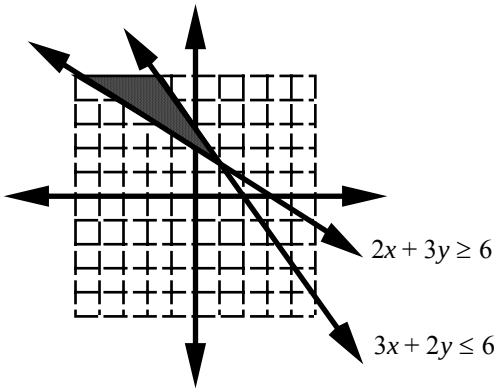
e) $x \geq -2$ $[-2, \infty)$ 

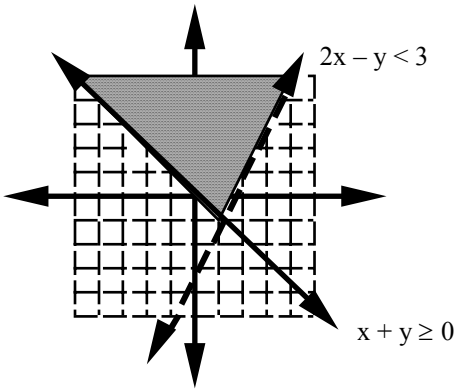
f) $-11 \leq y \leq 9$ $[-11, 9]$ 

11. a) $(-2, -2)$ **b)** $(2, 8)$ **c)** $(-3, 2)$ **d)** $(-4, -2)$

12. a) 

b) 

c) 

d) 

13. A = 500 sq. in. **14.** A = 250 sq. in. **15.** P = 8.5 mm **16.** C = .4π or 1.257 cm.

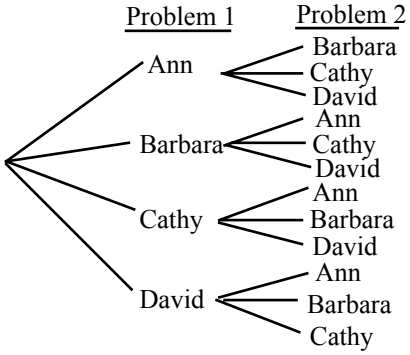
17. A = 14 sq. ft. **18.** A = 6 sq. cm. **19.** A = 8π or 25.14 sq. cm.

20. x = 16; y = 20 **21.** y = 3.75, so side = 8.75; x = 3.5

22. x = 11.9 miles **23.** x = 12 cm. **24.** x = 48 m

25. 12

26.



Ann, Barbara
Ann, Cathy
Ann, David
Barbara, Ann
Barbara, Cathy
Barbara, David
Cathy, Ann
Cathy, Barbara
Cathy, David
David, Ann
David, Barbara
David, Cathy

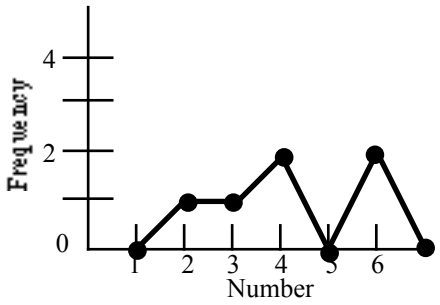
27. **a)** $\frac{1}{13}$ **b)** $\frac{1}{4}$ **c)** $\frac{1}{2}$ **d)** $\frac{12}{13}$ **28.** **a)** $\frac{1}{4}$ **b)** 1 **c)** 1:3

29. **a)** $\frac{1}{66}$ **b)** $\frac{1}{11}$ **c)** $\frac{5}{22}$ **d)** $\frac{4}{33}$ **e)** $\frac{15}{22}$ **f)** $\frac{5}{22}$

30. **a)** $\frac{1}{169}$ **b)** $\frac{1}{4}$ **c)** $\frac{1}{13}$ **d)** $\frac{12}{169}$ **e)** $\frac{9}{16}$

31. **a)** $\frac{1}{221}$ **b)** $\frac{13}{51}$ **c)** $\frac{1}{17}$ **d)** $\frac{16}{221}$ **e)** $\frac{19}{34}$

32.

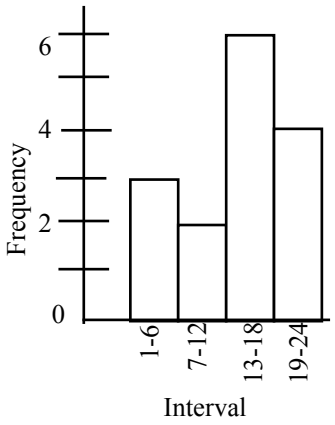


33.

a)

Interval	Frequency
1–6	3
7–12	2
13–18	6
19–24	4

b)

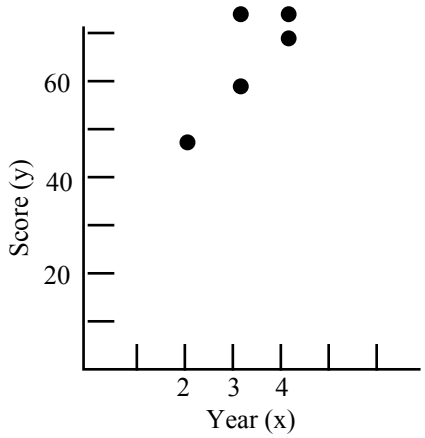


34. **a)** mean = 11.3 **b)** median = 9 **c)** mode = 8

35. **a)** R = 26; s = 10.12 **b)** R = 14; s = 5.22 **36.** **a)** 2.3% **b)** 15.9% **c)** 81.9%

37. **a)** 15.9% **b)** 97.7% **c)** 0.1% **d)** 68.3%

38. a)



b) Since 0.81 is less than 0.878 we can not conclude that there is a correlation in the population.