

Math Review Sheets
Math 20 – Basic Mathematics (Arithmetic)



The purpose of this Review Sheet is to provide students a comprehensive review of items that are taught in Math 20 classes. It is the KCC Math Department's objective to ensure students who enter a math class have the ability to perform satisfactorily in areas of study that are taught in the preceding class in the math sequence. The placement exam is only a small sampling of your knowledge. This set of problems offers a more comprehensive review to ensure the student possesses the skills expected of a student entering Math 70.

If you have been placed into Math 20 and feel you should have been placed higher, it is highly suggested you complete this review sheet before returning to retake the COMPASS exam.

Placement into a higher math class does not always ensure you have mastered the concepts expected of the prerequisite class. If you have placed into Math 70, it is suggested you review these sheets before the beginning of the term. Some topics covered in this review sheet will be taught as review in Math 70, but will be taught from the perspective that you have a familiarity with the topic.

How these sheets are helpful:

- To help students who have been out of school for some period of time and need to refresh their skills before returning
- To help students review before a placement exam
- To help you decide which math class is best for you. Your success and enjoyment of Math is usually based on getting started at the right level. Use this problem set along with the COMPASS exam to determine if your skill level is appropriate to move on to Math 70.
- To help students refresh their math skills during breaks between terms.

How to do the review:

- Pace yourself and don't rush. This is a comprehensive review of topics discussed from the adopted textbook for Math 20. It covers a variety of topics and it is not expected to be completed in one sitting.
- If you are having difficulty with a topic, consult the Learning Resources Center (LRC) for a copy of a textbook to borrow to help you relearn the concepts, or you may want to study with one of the on-site tutors. The whole point of these problems is to help you become more proficient in your math abilities. There are also many good web sites available to help you freshen up your knowledge of the concepts.
- Don't use these sheets as a substitution for taking a class. This review is designed to help you determine if you have the skills to proceed beyond Math 20.

This collection of Math 20 review problems have been taken from the adopted textbook of Klamath Community College. Further review of these materials can be found in the text.

Source: Tussy, Gustafson. Basic Mathematics for College Students 3rd Edition. United States: Brooks/Cole Thompson Learnign, 2006. A copy of this book is on reserve at the Learning Resources Center at KCC along with other learning aides.

Math 20

Percent, Decimals, and Fractions

1.) Change each percent to a fraction.

a. 15%

b. 120%

c. $9\frac{1}{4}\%$

d. 0.1%

2.) Change each percent to a decimal.

a. 27%

b. 8%

c. 155%

d. $1\frac{4}{5}\%$

3.) Change each decimal to a percent.

a. 0.83

b. 0.625

c. 0.051

d. 6

4.) Change each fraction to a percent.

a. $\frac{1}{2}$

b. $\frac{4}{5}$

c. $\frac{7}{8}$

d. $\frac{1}{16}$

5.) Change each fraction to a percent. Round to the nearest hundredth.

a. $\frac{5}{9}$

b. $\frac{8}{3}$

6.) **BILL OF RIGHTS** There are 27 amendments to the Constitution of the United States. The first ten are known as the Bill of Rights. What percent of the amendments were adopted after the Bill of Rights? (Round to the nearest one percent).

7.) Translate the given sentence into a percent equation.

What number is 32% of 96

8.) Solve each percent problem.

a. What number is 40% of 500?

b. 1.4 is what percent of 80?

c. Find 220% of 55

9.) HOME SALES After the first day on the market, 51 homes in a new subdivision had had already sold. This was 75% of the total number of homes available. How many homes were originally for sale?

10.) TIPPING The cost of dinner for a family of five at a restaurant was \$36.20. Find the amount of the tip it should be 15% of the cost of dinner.

Applications of Percent

11.) SALES TAX RATE Find the sales tax rate if the sales tax is \$492 on the purchase of an automobile priced at \$12,300.

12.) COMMISSION If the commission rate is 6%, find the commission earned by an appliance salesperson who sells a washing machine for \$369.97 and a dryer for \$ 299.97.

13.) GAS MILEAGE Experimenting with a new brand of gasoline in her truck, a woman found that the gas mileage fell from 18.8 to 17.0 miles per gallon. What percent of decrease is this? (Round to the nearest tenth of a percent).

Interest

14.) MONTHLY PAYMENTS A couple borrows \$1,500 for 1 year at $7\frac{3}{4}\%$ and decides to repay the loan by making 12 equal monthly payments. How much will each monthly payment be?

15.) $A = P \left(1 + \frac{r}{n} \right)^{nt}$

Find the amount of money that will be in a savings account at the end of 3 years if a deposit of \$5,000 earns interest at an annual rate of $6\frac{1}{2}\%$, compounded daily.

Ratios

16.) Express each phrase as a ratio in lowest terms.

a. The ratio of 4 inches to 12 inches

b. 21:14

17.) PAY SCALE Find the hourly rate of pay for a student who earned \$333.25 for working 43 hours.

18.) COMPARISON SHOPPING Mixed nuts come packaged in a 12-ounce can, which sells for \$4.95, or an 8-ounce can, which sells for \$3.25. Which is the better buy?

Proportions

19.) Determine whether each of the following statements is a proportion.

a. $\frac{15}{29} = \frac{105}{204}$

b. $\frac{17}{7} = \frac{204}{84}$

20.) Solve each proportion.

a. $\frac{12}{18} = \frac{3}{x}$

b. $\frac{4.8}{6.6} = \frac{x}{9.9}$

21.) **QUALITY CONTROL** In a manufacturing process, 12 parts out of 66 were found to be defective. How many defective parts will be expected in a run of 1,650 parts.

American Units of Measurement

22.) Make each conversion

a. 5 yards to feet

b. 66 inches to feet

12 in = 1ft 3 ft = 1yd 36 in = 1yd 5,280ft = 1

c. 9,20 feet to miles

23.) Make each conversion

a. 32 ounces to pounds

b. 3 tons to ounces

16 oz = 1lb 2,000 lb = 1 ton

24.) Make each conversion.

a. 5 pints to fluid ounces

b. 17 quarts to cups

$$\begin{aligned} 1 \text{ c} &= 8 \text{ fl oz} \\ 1 \text{ pt} &= 2 \text{ c} \\ 1 \text{ qt} &= 2 \text{ pt} \\ 1 \text{ gal} &= 4 \text{ qt} \end{aligned}$$

c. 5 gallons to pints

25.) Make each conversion

a. 20 minutes to seconds

b. 200 hours to days

$$\begin{aligned} 1 \text{ min} &= 60 \text{ sec} \\ 1 \text{ hr} &= 60 \text{ min} \\ 1 \text{ day} &= 24 \text{ r} \end{aligned}$$

e. 4.5 days to hours

26.) SKYSCRAPER The Sears Tower in Chicago is 1,454 feet high. Express this distance in yards.

Metric Units of Measurement

27.) Make each conversion.

a. 475 centimeters to meters

b. 3 dekameters to kilometers

$$\begin{aligned} 1 \text{ mm} &= \frac{1}{1000} \text{ m} \\ 1 \text{ cm} &= \frac{1}{100} \text{ m} \\ 1 \text{ dm} &= \frac{1}{10} \text{ m} \\ 1 \text{ dam} &= 10 \text{ m} \\ 1 \text{ hm} &= 100 \text{ m} \\ 1 \text{ km} &= 1,000 \text{ m} \end{aligned}$$

c. 5 kilometers to hectometers

28.) Make each conversion.

a. 7 centigrams to milligrams

b. 5,425 grams to kilograms

$$\begin{aligned} 1 \text{ mg} &= \frac{1}{1000} \text{ g} \\ 1 \text{ cg} &= \frac{1}{100} \text{ g} \\ 1 \text{ g} &= \frac{1}{1000} \text{ kg} \end{aligned}$$

c. 7,500 milligrams to grams

29.) PAIN RELIEVER A bottle of Extra Strength Tylenol contains 100 caplets of 500 milligrams each. How many grams of Tylenol are in the bottle?

30.) Make each conversion

a. 150 centiliters to liters

b. 1 hectoliter to deciliter

c. 2 kiloliters to hectoliters

$$\begin{aligned}1 \text{ mL} &= \frac{1}{1000} \text{ L} \\1 \text{ cL} &= \frac{1}{100} \text{ L} \\1 \text{ dL} &= \frac{1}{10} \text{ L} \\1 \text{ L} &= 1,000 \text{ cc} \\1 \text{ hL} &= 100 \text{ L} \\1 \text{ kL} &= 1,000 \text{ L}\end{aligned}$$

Converting between American and Metric Units

31.) SWIMMING Olympic-size swimming pools are 50 meters long. Express this distance in feet.

$$\begin{aligned}1 \text{ in} &= 2.54 \text{ cm} \\1 \text{ ft} &= 0.3048 \text{ m} \\1 \text{ yd} &= 0.9144 \text{ m} \\1 \text{ mi} &= 1.6093 \text{ km} \\1 \text{ cm} &= 0.3937 \text{ in} \\1 \text{ m} &= 3.2808 \text{ ft} \\1 \text{ m} &= 1.0936 \text{ yd} \\1 \text{ km} &= 0.6214 \text{ mi}\end{aligned}$$

32.) HIGH-RISE BUILDING The World Trade Center was 419 meters high, and the Empire State Building is 1,250 feet high. Which building is taller?

33.) Michael Jordan is 6 feet, 6 inches tall. Express his height in centimeters.

34.) LaCroix bottled water can be purchased in bottles containing 17 fluid ounces. Mountain Valley water can be purchased in half-liter bottles. Which bottle contains more water?

$$\begin{aligned}1 \text{ fl oz} &= 0.030 \text{ L} \\1 \text{ pt} &= 0.473 \text{ L} \\1 \text{ qt} &= 0.946 \text{ L} \\1 \text{ gal} &= 3.785 \text{ L} \\1 \text{ L} &= 33.8 \text{ fl oz} \\1 \text{ L} &= 2.1 \text{ pt} \\1 \text{ L} &= 1.06 \text{ qt} \\1 \text{ L} &= 0.264 \text{ gal}\end{aligned}$$

35.) Change 77°F to degrees Celsius.

$$C = \frac{5F - 160}{9}$$
$$F = \frac{9}{5}C + 32$$

Reading Graphs

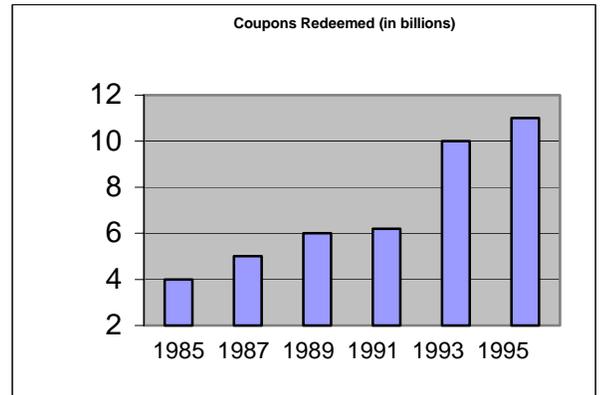
36.) Refer to the chart below to answer the following questions:

a.) How many coupons were redeemed in 1987?

b.) Between what years did the number of redeemed coupons remain essentially unchanged?

c.) In what two-year period did the number of redeemed coupons increase the most?

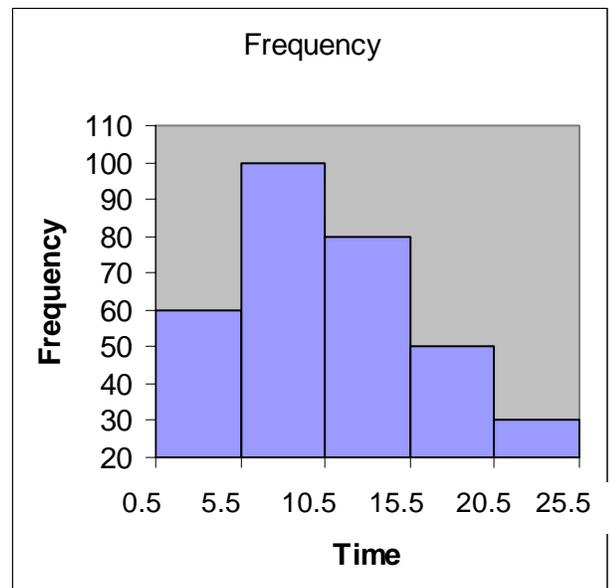
d.) What was the percent of the greatest two year increase?



37.) Refer to the chart to the right to answer the following questions:

a.) A survey of the television viewing habits of 320 households produced the histogram to the right. How many households watched between 5 and 15 hours of TV each week?

b.) How many households watch 11 hours or more each week?



Mean, Median, and Mode

38.) Jose worked hard this semester, earning grades of 87, 92, 97, 100, 100, 98, 90, and 98. If he needs a 95 average to earn an A in the class, did he make it?

39.) A medical laboratory technician examined a blood sample under a microscope and measured the sizes (in microns) of the white blood cells. The data is listed below. Find the mean, median, and mode.

7.8 6.9 7.9 6.7 6.8 8.0 7.2 6.9 7.5

Solving Equations

40.) Tell whether the given number is a solution to the equation.

$x + 2 = 13$ is 5 a solution?

41.) Solve each equation and check the result.

a.) $x - 7 = 2$

b.) $225 = y - 15$

c.) $x + 9 = 18$

d.) $175 = p + 55$

42.) A newly married couple made a \$25,500 down payment on a \$122,750 house. How much did they need to borrow?

43.) Solve each equation and check the result.

a.) $3x = 12$

b.) $105 = 5r$

c.) $\frac{x}{7} = 3$

d.) $15 = \frac{r}{21}$

44.) Four sisters split the cost of a gold chain evenly. How much did the chain cost if each sister's share was \$32?

Algebraic Expressions and Formulas

45.) Evaluate each algebraic expression.

a.) $-2x + 6$ for $x = -3$ b.) $b^2 - 4ac$ for $a = 4$, $b = 6$ and $c = -4$

46.) Find the sale price of a trampoline that normally sells for \$315 if a \$37 discount is being offered.

47.) Find the retail price of a car if the dealer pays \$14,505 and the markup is \$725.

Simplifying Algebraic Expressions

48.) Simplify

a.) $-2(5x)$ b.) $-7x(-6y)$

c.) $4d \div 3e \div 5$ d.) $(4s)8$

e.) $4(y + 5)$ f.) $(-3 - 3x)7$

g.) $-3(4e - 8x - 1)$ h.) $-(6t - 4)$

49.) Identify the second term and the coefficient of the third term.

$$5x^2 - 4x + 8$$

50.) Simplify and combine like terms

a.) $3x + 4x$

b.) $-3t - 6t$

c.) $6x - x$

d.) $5w - 8 - 4w + 3$

e.) $-45d - 2a + 4a - d$

f.) $7(y + 6) + 3(2y + 2)$

g.) $5x - 2(x - 6)$

Simplifying Expressions to Solve Equations

51.) Solve each equation and check your answer

a.) $3x + 4 = -8$

b.) $7x = 3x - 12$

c.) $-3(2x + 4) - 4 = -40$

d.) $-6(2x + 3) = -(5x - 3)$

Exponents

52.) Simplify each exponential expression

a.) $h^6 h^4$

b.) $t^3 (t^5)$

c.) $2b^2 \square 4b^5$

d.) $xy^4 \square xy^2$

e.) $(3y)^2$

f.) $(5t^4)^2$

g.) $(c^4)^5 (c^2)^3$

h.) $(c^4 c^3)^2$