REVIEW SHEETS
BASIC MATHEMATICS
MATH 020

A Summary of Concepts Needed to be Successful in Mathematics

The following sheets list the key concepts that are taught in the specified math course. The sheets present concepts in the order they are taught and give examples of their use.

WHY THESE SHEETS ARE USEFUL –

- To help refresh your memory on old math skills you may have forgotten.
- To prepare for math placement test.
- To help you decide which math course is best for you.

HOW TO USE THESE SHEETS –

- Students who successfully review spend from four to five hours on this material. We recommend that you cover up the solutions to the examples and try working the problems one by one. Then check your work by looking at the solution steps and the answer. **Note: no calculators can be used on this test, so you should practice without using one.**

KEEP IN MIND –

- These sheets are not intended to be a short course. You should use them simply to help you determine at what skill level in math you should begin study. For many people, the key to success and enjoyment of learning math is in getting started at the right place. You will most likely be more satisfied and comfortable if you start onto the path of math and science by selecting the appropriate beginning stepping stone.

I. Ratio, rate, proportion and averages – You should have the following skills with ratio, rate, proportion and averages:

- **Recognize the three forms of notation.**
- **Solve application problems involving ratio and rate.**
- **Solve proportions for missing parts.**
- **Solve application problems involving proportions.**
- **Find the average of a set of numbers.**

1. Show the ratio of two values *a* and *b* three different ways.

2. If there are 2 doctors for every 125 people in a certain town, give the ratio of doctors to people and the ratio of people to doctors.

3. If a car can travel 120 miles on 3 gallons of gas, what is its mileage per gallon?

4. If 7 dozen eggs cost $4.41, what is the cost per dozen?

5. If 6.34 cm of a steel beam weighs 31.7 kg, what is the weight per cm?

6. Solve each proportion for *x*:

   a. $\frac{3}{6} = \frac{x}{8}$ b. $\frac{4}{6} = \frac{10}{x}$

   c. $\frac{5}{x} = \frac{2}{3}$ d. $\frac{x}{4.2} = \frac{9.6}{5}$

7. If 2 inches on a map represents 270 miles, how many inches on the map represents 60 miles?

8. If a can of paint covers 320 sq. ft., how many cans (whole cans) are needed to cover 1650 sq. ft.?

9. Two pounds (lbs) of butter will make 5 batches of cookies. How many pounds of butter will make 24 batches of cookies?

10. Find the average of 92, 63, 77, 89.

11. Find the average of 100, 72, 81, 93, 88.

II. Percents – You should have the following skills with percents:

- **Change a percent to a decimal.**
- **Change a decimal to a percent.**
- **Change a percent to a reduced fraction.**
- **Change a fraction to a percent.**
- **Solve the 3 types of percent problems.**
- **Solve application problems involving percents.**

12. Change to decimals:

    a. 30%

    b. 3.92%

    c. $12\frac{1}{2}\%$

13. Change to percents:

    a. 41.6

    b. 0.016

    c. 0.42

14. Change to reduced fractions:

    a. 80%

    b. $25\frac{1}{2}\%$

    c. 6%

15. Change to percents:

    a. $\frac{1}{4}$

    b. $\frac{2}{3}$

    c. $\frac{5}{8}$

16. What % of 30 is 25?

17. What is 12% of 52?

18. 42 is 43% of what number?

19. 30% of 280 students can type. How many can type?

20. 7 out of 54 items coming off an assembly line are defective. What percent is this?

21. A 5.5% tax on a ring is $9.50. What is the original cost of the ring?

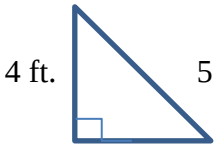
III. Geometry – You should have the following skills with Geometry:

- **Find perimeter and area of rectangles.**
- **Find perimeter and area of triangles.**
- **Find circumference and area of circles.**
- **Solve application problems involving area.**
- **Find square roots.**

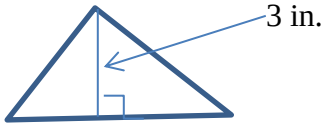
22. What is the area of a square that is 2 inches on each side?

23. What are the perimeter and area of a rectangle that is 13 cm by 6 cm?

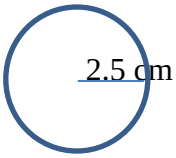
24. Find the perimeter and area of this triangle.



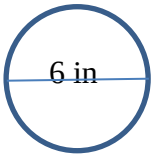
25. Find the area of this triangle.



26. Find the circumference and area of this circle. (Use 3.14 for π.)



27. Find the circumference and area of this circle. (Use 3.14 for π.)



28. What is the area of a square baseball diamond that is 90 ft. on each side?

29. Find each square root:

a. $\sqrt{25}$ b. $\sqrt{81}$

IV. Algebra – You should have the following skills with algebra:

- **Solve equations with whole numbers, fractions and decimals using one-step subtraction and division processes**
- **Write and solve equations for application problems**

30. Solve for x in each equation:

a. $x - 4\frac{1}{3} = 6\frac{2}{3}$

b. $\frac{3}{4} \cdot x = \frac{5}{6}$

31. A cookie recipe calls for $\frac{2}{3}$ cup of sugar. How many batches of cookies can be made from 6 cups of sugar?

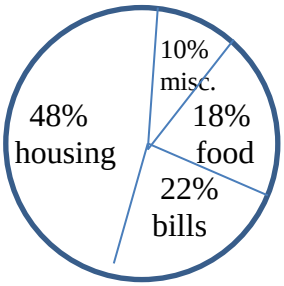
IV. Graphing – You should have the following skills with graphing:

- **Read a circle graph.**

32. Use this circle graph of a family's expenses to answer these questions:

a. If the family makes $33,500 per year, how much is spent for food?

b. What percent of the family income is spent on miscellaneous and bills?



Math 020 Review Answers

1. a:b a to b $\frac{a}{b}$

2. $\frac{2}{125}$ $\frac{125}{2}$

3. $\frac{120\ miles}{3\ gal} = \frac{40\ miles}{1\ gal} = 40\ mpg$

4. $\frac{\$4.41}{7\ doz} = \frac{\$0.63}{1\ doz} = \$0.63\ per\ dozen$

5. $\frac{31.7\ kg}{6.34\ cm} = \frac{5\ kg}{1\ cm} = 5\ kg\ per\ cm$

6a. $\frac{3}{6} = \frac{x}{8}$ $6 \cdot x = 3 \cdot 8$ $6 \cdot x = 24$ so $x = 4$

6b. $4 \cdot x = 60$ so $x = 15$

6c. $2 \cdot x = 15$ so $x = 7.5$

6d. $5 \cdot x = 40.32$ so $x = 8.064$

7. $\frac{2\ in}{270\ mi} = \frac{x}{60\ mi}$ $270 \cdot x = 120$ so $x \approx 0.44$; 0.44 in

8. $\frac{1\ can}{320\ sq\ ft} = \frac{x\ cans}{1659\ sqft}$ x = 5.15625
6 cans

9. $\frac{2\ lbs}{5\ batches} = \frac{x\ lbs.}{24\ batches}$ $5 \cdot x = 48$ so $x = 9.6$ lbs.

10. $\frac{92+63+77+89}{4} = 80.25$

11. $\frac{100+72+81+93+88}{5} = 86.8$

12a. 30% = .30

12b. 3.92% = .0392

12c. $12\frac{1}{2}$ % = 12.5 % = 0.125

13a. 41.6 = 4160 %

13b. 0.016 = 1.6%

13c. 0.42 = 42%

14a. 80% = $\frac{80}{100} = \frac{4}{5}$

14b. $25\frac{1}{2}$ % = 25.5% = 0.255 = $\frac{255}{1000} = \frac{51}{200}$

14c. 6% = $\frac{6}{100} = \frac{3}{50}$

15a. $\frac{1}{4}$ = 0.25 = 25%

15b. $\frac{2}{3}$ = 0.667 = 66.7%

15c. $\frac{5}{8}$ = 0.625 = 62.5%

16. $\frac{M}{100} = \frac{25}{30}$ M ≈ 83.3; $\frac{M}{100}$ ≈83.3%

17. $\frac{12}{100} = \frac{x}{52}$ x = 6.24

18. $\frac{43}{100} = \frac{42}{x}$ x ≈ 97.67

19. $\frac{30}{100} = \frac{x}{280}$ x = 84 students

20. $\frac{M}{100} = \frac{7}{54}$ M ≈ 12.96; $\frac{M}{100}$ ≈12.96%

21. $\frac{5.5}{100} = \frac{\$9.50}{x}$ x ≈ $172.73

Formulas:

Perimeter of rectangle: P = 2ℓ + 2w, where ℓ = length and w = width
Area of rectangle: A = $\ell \cdot w$
Perimeter of triangle: P = D + E + F, where D, E, and F are sides of triangle
Area of triangle: A = $\frac{1}{2} \cdot b \cdot h$, where b = base and h = height
Circumference of circle = $\pi \cdot d$ or $2 \cdot \pi \cdot r$ where d = diameter, r = radius, $\pi \approx 3.14$
Area of circle = $\pi \cdot r^2$

22. 2 in · 2 in = 4 sq. in

23. P = 2 · 13 cm + 2 · 6 cm = 38 cm
A = 13 cm · 6 cm = 78 sq. cm

24. P = 4 ft + 3 ft + 5 ft = 12 ft
A = $\frac{1}{2}$ · 3 ft · 4 ft = 6 sq. ft

25. A = $\frac{1}{2}$ · 7 in · 3 in = $10\frac{1}{2}$ sq. in or 10.5 sq. in

26. C = 2 · π · 2.5 cm ≈ 15.7 cm
A = π · (2.5 cm)^2 ≈19.625 sq. cm

27. C = π · 6 in ≈18.84 in.
A = π · (3 in)^2 ≈28.26 sq. in

28. Area = 90 ft. · 90 ft. = 8100 sq. ft.

29a. $\sqrt{25} = 5$

29b. $\sqrt{81} = 9$

30a. x = $4\frac{1}{3} + 6\frac{2}{3}$

x = 11

30b. x = $\frac{5}{6} \div \frac{3}{4}$

x = $\frac{5}{6} \cdot \frac{4}{3}$

x = $\frac{20}{18} = 1\frac{2}{18} = 1\frac{1}{9}$

31. 6 cups ÷ $\frac{2}{3}$ cups = 9
9 batches

32a. $\frac{18}{100} = \frac{x}{\$33{,}500}$ x = 6,030

$6,030

32b. 10% + 22% = 32%