DIAGNOSTIC TESTS

The Comprehensive Diagnostic Test results give the instructor a general idea of the student's math skills. From this, the instructor can determine which units the student will need and how much time might be needed.

With the exception of Unit 3 Word Problems: Whole Numbers and Unit 6 Word Problems: Fractions, each unit includes its own unit diagnostic test. Its purpose is to help determine more exactly what sections of the unit the student needs to study. The diagnostic answer sheet tells where each skill is covered in the unit.

The word-problem units don't have unit diagnostics because a student would generally do all of those units, not just parts of them.

Diagnostic testing should be done at a time and location where the instructor can pay some attention to how the student is doing while working through the problems, particularly to be aware of areas where the student shows uncertainty.

The student should do all the math work neatly on the test itself. By looking over the student's step-by-step work, the instructor can spot the weak or missing skills.

Note: Often a tangle in a later subject can resolve by sorting out some earlier fundamental. For instance, trouble with decimal operations might resolve by sorting out how the place value system works. What the student needs to study, as shown by the Comprehensive Diagnostic Test, may require that the instructor look at the student's work and have some discussion with the student. Additionally, what a student appears to need initially may change later on.

Comprehensive Diagnostic Test

There are two sections of this test: Part A, which is written, and Part B, which is done with the instructor observing. Write all your work neatly so the instructor can understand everything you did.

PART A

Place Value

1. Write out the digits for the following number:
   Eight hundred nine billion seventy thousand six hundred

2. Write out in words the following number:
   15,096,245,101

Addition, Subtraction and Multiplication

1. 790,081 – 8,504 =

2. 78,297 + 9,078 + 6,009 + 89 =

3. 62,097
   × 608

Division

1. $346\overline{)24533130}$

2. What is the average of these numbers: 18, 1, 17, 18, 25, 0, 19?

Word Problems Using Whole Numbers

1. I have five horses whose average weight is 1,497 pounds. Darya has five horses whose weights are 1,785, 1,622, 1,748, 1,869 and 1,641 pounds. Whose horses have the higher average weight? How much higher?

2. A truck driver drove 476 miles each day for 27 days. How much farther does he need to drive to get to 15,000 miles?

Adding and Subtracting Fractions

1. Change $\frac{18}{42}$ to lowest terms.
2. Change $\frac{28}{6}$ to a mixed number in lowest terms.

For problems 3 and 4 below, give your answers as fractions or mixed numbers in lowest terms.

3. $7\frac{5}{8} + 3\frac{5}{6} + 5\frac{1}{2} =$
4. $10\frac{1}{7} - 3\frac{2}{3} =$

Multiplying and Dividing Fractions

Give your answers as fractions or mixed number in lowest terms.

1. $\frac{3}{8}$ of 124 =
2. $2\frac{2}{3}$ x 15 =
3. $6\frac{2}{3}$ x $2\frac{3}{4}$ =
4. $\frac{2}{3} \div 1\frac{5}{8} =$
5. $24\frac{3}{7} \div 47 =$

Word Problems Using Fractions

1. I had $16\frac{7}{8}$ cups of flour and I used up $\frac{2}{3}$ of it. How many cups did I use up?
2. I have 17 gallons of gasoline in my tank. I use $1\frac{7}{8}$ gallons to get to school and back every day. How many days can I go to school and back before I run out of gasoline?
3. I started out with 10 pounds of flour. During the next three days I used $\frac{3}{4}$ pound, $2\frac{1}{2}$ pounds and $1\frac{1}{3}$ pounds of flour. How many pounds of flour do I have left?
4. One rope is $130\frac{1}{2}$ inches. Another is $4\frac{7}{8}$ inches smaller. How long is the shorter rope?

Decimals

For problems 1 and 2 below, write the decimal shown as a fraction or a mixed number and write how to say each decimal.

1. 0.0241

2. 100.101

3. $\begin{array}{r} 5097.3 \\ \times\ 0.0908 \\ \hline \end{array}$

4. 287 – 0.0065 =

5. 10.058 – 0.97 =

6. $659\overline{)15.157}$

7. $0.436\overline{)251.275}$

8. 15.09 + 1,047 + 0.0078 =

9. I worked 15.75 hours and earned $178. How much was I paid per hour?

10. How much would it cost to buy 16.38 gallons of gasoline if the gasoline costs $4.47 for each gallon?

11. I drove the following distances:

Monday:	46 miles
Tuesday:	127.65 miles
Wednesday:	9.9 miles

    How far did I drive altogether?

12. I have $25 for gas, which costs $2.95 per gallon. How many gallons can I buy, rounded to the nearest gallon?

13. My suitcase weighed 39.82 pounds when I left for my vacation. When I got back, it weighed 45.07 pounds. How much more did the suitcase weigh?

14. A bottle contains 28 fluid ounces of liquid hand soap. Every time someone pushes the lever on the bottle, 0.67 fluid ounces are used. Assuming each person pushes only once, how many people can use the hand soap before it runs out?

Metric Measurement

1. 3,906 millimeters = how many meters?
2. 3,906 millimeters = how many kilometers?
3. 0.218 meters = how many centimeters?
4. 709 millimeters = how many centimeters?
5. 0.41 kilograms = how many grams?
6. 61 milligrams = how many grams?
7. 5.07 liters = how many milliliters?
8. 2,205 milliliters = how many liters?

Customary Measurement

Use the tables below to do problems 1 to 6.

Customary units of distance

12 inches = 1 foot
3 feet = 1 yard = 36 inches
5,280 feet = 1 mile = 1,760 yards

Customary units of weight

16 ounces = 1 pound
2,000 pounds = 1 ton

Customary units of volume

8 fluid ounces = 1 cup
2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

1. $117\frac{1}{2}$ inches = _____ feet _____ inches
2. 140 feet 5 inches = _____ yards _____ feet _____ inches
3. 3,562 feet = _____ miles
4. 71 ounces = _____ pounds _____ ounces
5. 12,250 pounds = _____ tons
6. 128 fluid ounces = _____ quarts

Simple Algebra

Solve the equations below for x. Show all your work.

1. $x + 17 = 91$

2. $6x = 44.4$

3. $123 = \frac{x}{-3}$

4. $18.82 = x - 4.9$

5. $50x = -2.09$

6. After I spent $147.93 at the mall, I got home and had $213.45. How much money did I have when I got to the mall?

7. Three of my friends and I were treasure hunting and found x dollars. We divided it up evenly and each of us got $255.96. How much did we find?

Ratios, Proportion and Percent

1. It took me 50 minutes to read 30 pages. If I continue reading at the same rate, how long will it take me to read another 160 pages (rounded to the nearest minute)?

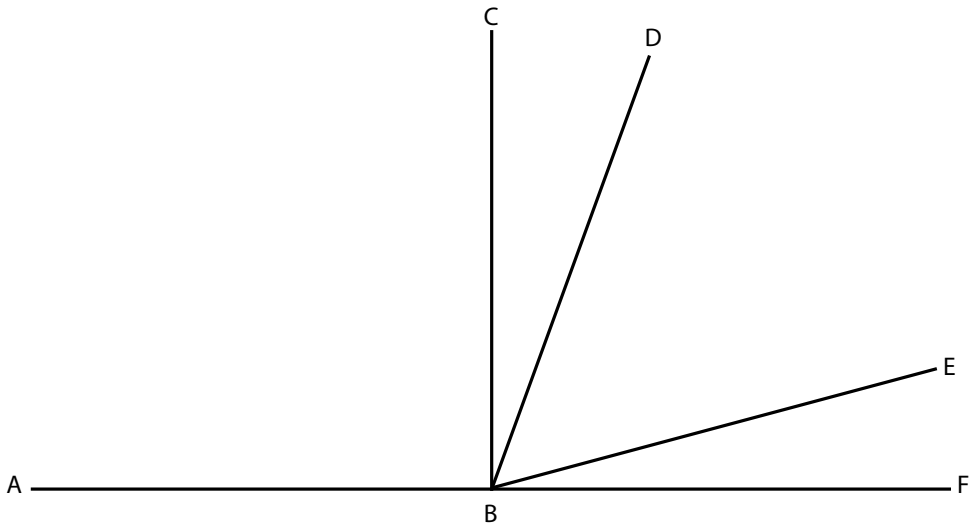
2. A book has 396 pages. I have read 42% of the book. How many pages have I read?

3. I got 38 questions right on a test, and my score was 95%. How many questions were on the test?

4. An item at a store usually sells for $250 but is on sale now for $235. By what percent has the price been reduced?

Simple Geometry

Use this drawing to answer the questions 1–3 below.

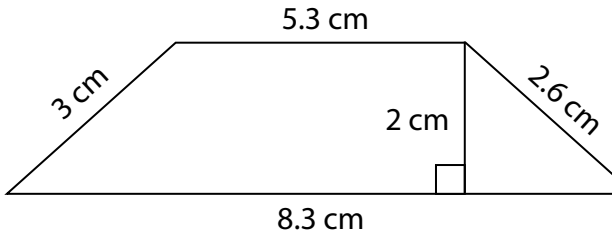


1. Using a protractor, find the size of angle ABD.

2. Find the size of angle EBF.

3. Name a right angle in the above drawing.

4. Find the perimeter of the shape below.

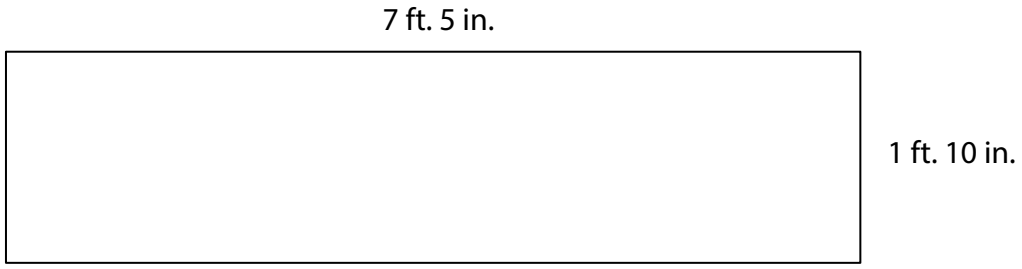


5. Find the radius of a circle that has a circumference of 57 centimeters. Show all your work.

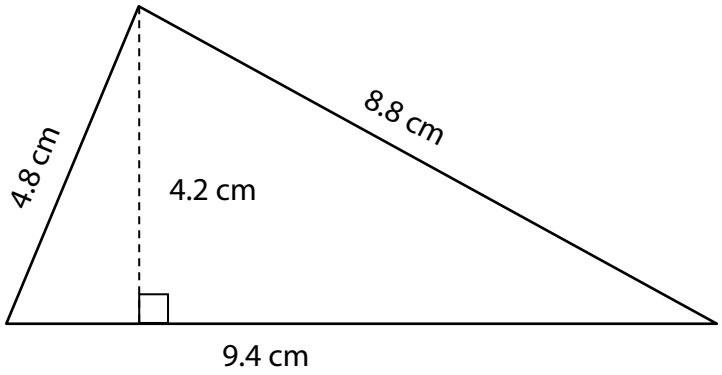
6. 5 to the 4^{th} power =

7. 8^3 =

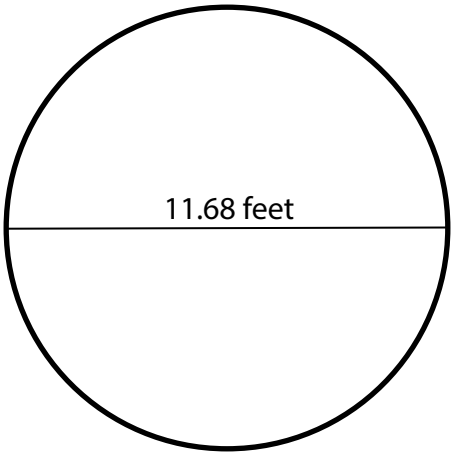
8. Find the area of the shape below. Include the units in your answer.



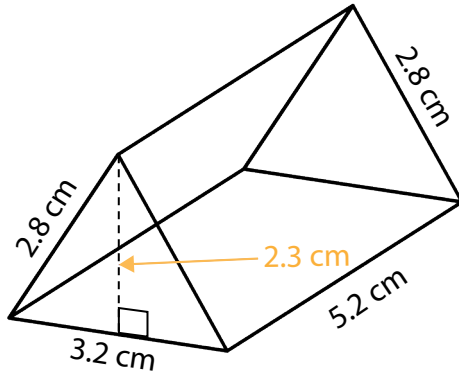
9. Find the area of the shape below. Include the units in your answer.



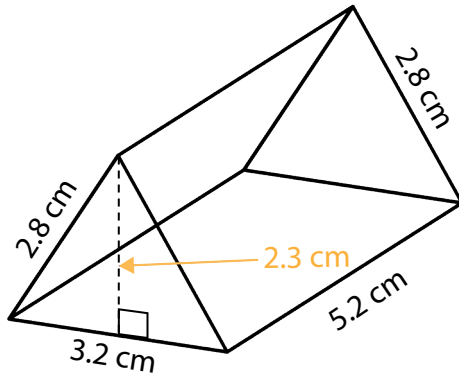
10. Find the area of the shape below. Include the units in your answer.



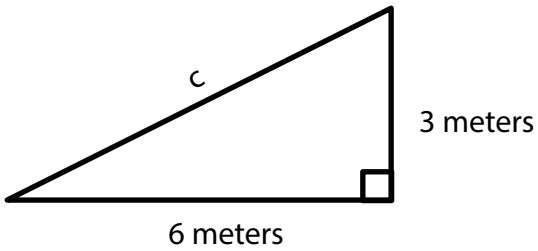
11. Find the surface area of the shape below. Include the units in your answer.



12. Find the volume of the shape below. Include the units in your answer.



13. Find the length of side c in the shape below. Include the units in your answer.



14. $\sqrt{676}$

PART B

To be done with the instructor.

Metric Measurement

Have your instructor watch you measure out the following:

1. 21.8 centimeters
2. 634 millimeters
3. 290 grams of weight
4. 98 milliliters of water

Customary Measurement

Have your instructor watch you measure the following:

1. 5 feet $4\frac{7}{8}$ inches
2. 3 pounds 13 ounces
3. 2 quarts, 1 pint, 7 fluid ounces

Positive and Negative Numbers

Have your instructor watch you do all the problems in this section.

1. (–8) + (+5) =
2. (–3) + (–7) =
3. (–32) ÷ (+8) =
4. (+2) – (+2) =
5. (–4) x (+7) =
6. (+2) – (–5) =
7. (+1) – (+5) =
8. (+3) – (+1) =
9. (+5) + (–2) =
10. (+6) x (–4) =
11. (–7) – (–4) =
12. (–8) ÷ (–4) =
13. (–5) x (–3) =
14. (+16) ÷ (–2) =

Answers to Comprehensive Diagnostic Test

PART A

Place Value

1. 809,000,070,600
2. fifteen billion ninety-six million two hundred forty-five thousand one hundred one

Addition, Subtraction and Multiplication

1. 781,577
2. 93,473
3. 37,754,976

Division

1. 70,905
2. 14

Word Problems Using Whole Numbers

1. Darya's horses, 236 pounds
2. 2,148 miles

Adding and Subtracting Fractions

1. $\frac{3}{7}$
2. $4\frac{2}{3}$
3. $16\frac{23}{24}$
4. $6\frac{10}{21}$

Multiplying and Dividing Fractions

1. $46\frac{1}{2}$
2. 40
3. $18\frac{1}{3}$
4. $\frac{16}{39}$
5. $\frac{171}{329}$

Word Problems Using Fractions

1. $11\frac{1}{4}$ cups
2. 9 days
3. $5\frac{5}{12}$ pounds
4. $125\frac{5}{8}$ inches

Decimals

1. $\frac{241}{10,000}$, two hundred forty-one ten thousandths
2. $100\frac{101}{1,000}$, one hundred and one hundred one thousandths
3. 462.83484
4. 286.9935
5. 9.088
6. .023
7. 576.3188
8. 1,062.0978
9. $11.30 (rounded)
10. $73.22 (rounded)
11. 183.55 miles
12. 8 gallons
13. 5.25 pounds
14. 41 people

Metric Measurement

1. 3.906 m
2. .003906 km
3. 21.8 cm
4. 70.9 cm
5. 410 g
6. 0.061 g
7. 5,070 ml
8. 2.205 L

Customary Measurement

1. 9 ft. $9\frac{1}{2}$ in.
2. 46 yd. 2 ft. 5 in.
3. .67 mi. (rounded)
4. 4 lb. 7 oz.
5. 6.125 T.
6. 4 qt.

Simple Algebra

1. $x = 74$
2. $x = 7.4$
3. $x = -369$
4. $x = 23.72$
5. $x = -0.0418$
6. $x - \$147.93 = \$213.45$, $x = \$361.38$
7. $\frac{x}{4} = \$255.96$, $x = \$1{,}023.84$

Ratios, Proportion and Percent

1. 267 minutes = 4 hr. 27 min.
2. 166.32 pages
3. 40 questions
4. 6%

Simple Geometry

1. 110 degrees
2. 15 degrees
3. ABC or CBF
4. 19.2 cm
5. 9.08 cm (rounded)
6. 625
7. 512
8. 1,958 in^2
9. 19.74 cm^2
10. 107.09 ft^2
11. 53.12 cm^2
12. 23.3 cm^2
13. 6.7 m (rounded)
14. 26

PART B

Metric Measurement

Observe the student to ensure the measurements are correct.

Customary Measurement

Observe the student to ensure the measurements are correct.

Positive and Negative Numbers

The student should be able to do these problems correctly and without hesitation.

1. –3
2. –10
3. –4
4. 0
5. –28
6. 7
7. –4
8. 2
9. 3
10. –24
11. –3
12. 2
13. 15
14. –8