mathESSENTIALS

Diagnostic Tests

Comprehensive Diagnostic Test 3

Diagnostic Test Unit 1 Place Value 13

Diagnostic Test Unit 2 Division 15

Diagnostic Test Unit 4 Fractions: Adding & Subtracting 17

Diagnostic Test Unit 5 Fractions: Multiplying & Dividing 19

Diagnostic Test Unit 7 Decimals 21

Diagnostic Test Unit 8 Metric Measurement 23

Diagnostic Test Unit 9 Customary Measurement 27

Diagnostic Test Unit 10 Positive and Negative Numbers 31

Diagnostic Test Unit 11 Simple Algebra 35

Diagnostic Test Unit 12 Ratio, Proportion and Percent 37

Diagnostic Test Unit 13 Simple Geometry 39

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)?

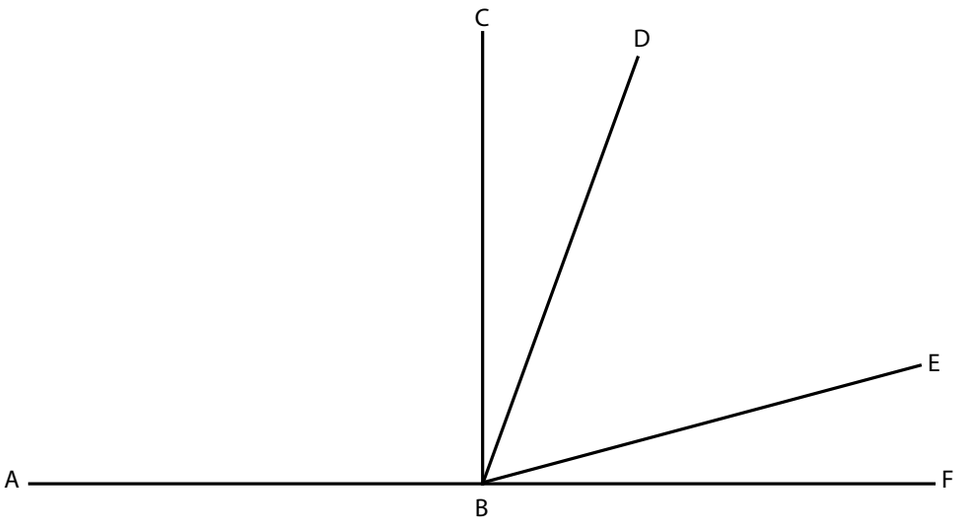
2. A book has 396 pages. I have read 42% of the book. How many pages have I read?

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.

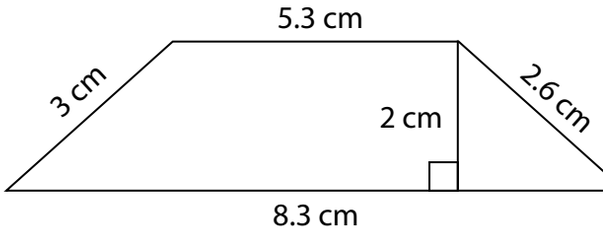


1. Using a protractor, find the size of angle ABD.

2. Find the size of angle EBF.

3. Name a right angle in the above drawing.

4. Find the perimeter of the shape below.

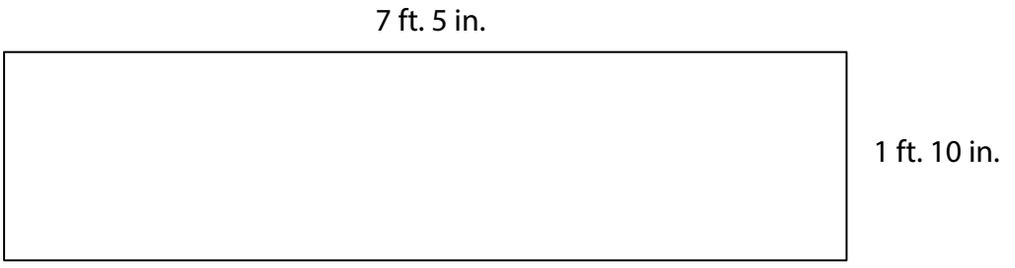


5. Find the radius of a circle that has a circumference of 57 centimeters. Show all your work.

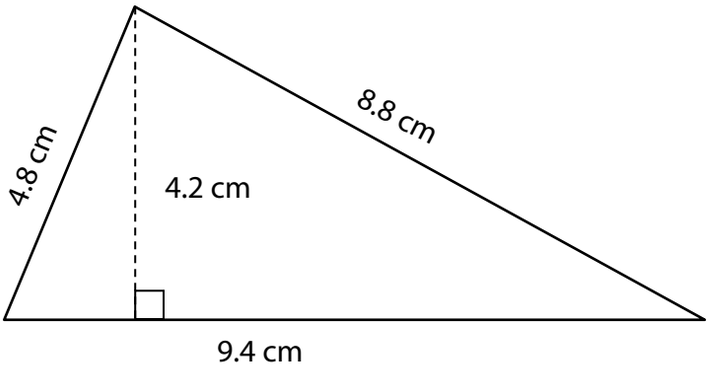
6. 5 to the 4^{th} power =

7. 8^3 =

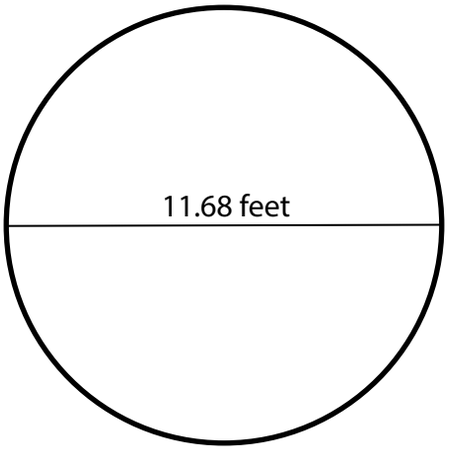
8. Find the area of the shape below. Include the units in your answer.



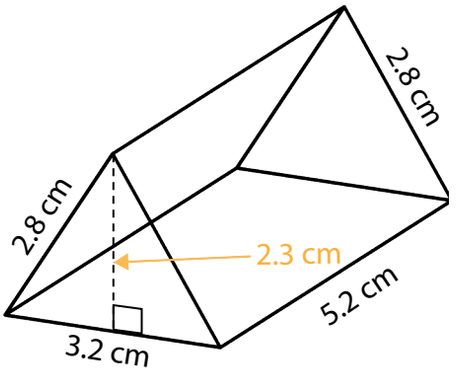
9. Find the area of the shape below. Include the units in your answer.



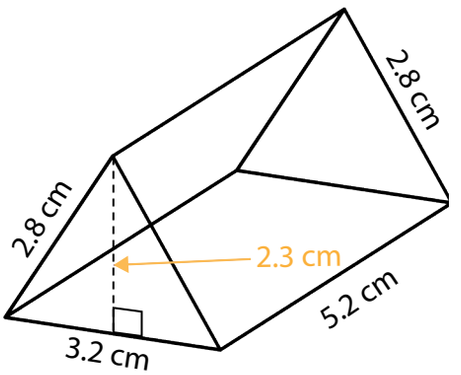
10. Find the area of the shape below. Include the units in your answer.



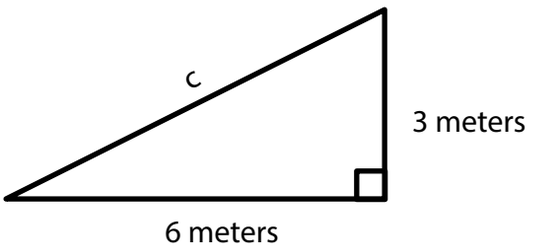
11. Find the surface area of the shape below. Include the units in your answer.



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) =

Diagnostic Test
Unit 1 Place Value

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as the answers.

1. What does "digit" mean in mathematics, and how do we use digits?

2. What does "place value" mean in mathematics?

3. In the number 3,172
   a) what is the place value of the 3?
   b) what is the place value of the 1?
   c) what is the place value of the 7?
   d) what is the place value of the 2?

4. Write the following number in digits, and put commas in the correct places: *Twenty-eight thousand eight hundred seventy-one*

5. Write the following number in digits, and put commas in the correct places: *Four hundred seventy-six thousand nine hundred ten*

6. Write the following number in digits, and put commas in the correct places: *Fifteen billion two hundred sixteen million five hundred thirty-two thousand one hundred ninety*

7. Write out the following number in words: 324,079,671,843

8. Write out the following number in words: 10,500,000

9. Round 8,463 to the nearest ten.

10. Round 8,463 to the nearest hundred.

11. Round 16,500 to the nearest thousand.

12. Round 9,509,499 to the nearest million.

Diagnostic Test
Unit 2 Division

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as the answers.

1. What does "division" mean?

2. What word means "the answer to a division problem"?

3. What word means "the number you are dividing into"?

4. What does the symbol "÷" mean?

5. Do this division problem. If an answer does not come out evenly, give the remainder. After you have solved the problem, show how you would check your answer to see that it is correct.

   $27\overline{)167}$

6. Do this division problem. If an answer does not come out evenly, give the remainder.

   $54\overline{)2{,}104}$

7. Do the four division problems below. If an answer does not come out evenly, give the remainder.

   a) $5\overline{)512}$

   b) $77\overline{)462{,}617}$

   c) $321\overline{)199{,}362}$

   d) $296\overline{)1{,}097{,}568}$

8. Do the two division problems below.

   a) $0\overline{)59}$

   b) $41\overline{)0}$

9. One day I read a book for 2 hours in the morning and for 4 hours after lunch. I read 138 pages that day. What was my average number of pages per hour?

10. The players on a team weigh the following amounts (measured in pounds): 181, 126, 175, 150 and 163. What is the average weight?

Diagnostic Test
Unit 4 Fractions: Adding & Subtracting

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as the answers.

1. Mark the box below to show $\frac{3}{5}$ of the box.

2. Write down what the numerator of a fraction is and what the numerator means.

3. Write down what the denominator of a fraction is and what the denominator means.

4. Reduce the fractions below to lowest terms.

   $\frac{8}{18}$ $\frac{24}{80}$ $\frac{5}{5}$

5. Rewrite the two fractions below so that they have a common denominator.

   $\frac{5}{9}$ $\frac{5}{6}$

6. Using a common denominator, show which of the two fractions below is bigger.

   $\frac{8}{11}$ $\frac{5}{7}$

7. Write the answer in lowest terms.

   $\frac{4}{15} - \frac{1}{6} =$

8. Write the answer in lowest terms.

$\frac{1}{4} + \frac{1}{7} =$

9. In 15 minutes, I walked $\frac{2}{3}$ mile and my friend walked $\frac{5}{8}$ mile. Who walked farther? How much farther?

10. I walked $\frac{3}{4}$ mile on Monday and $\frac{5}{6}$ mile on Tuesday. How far did I walk altogether? Write your answer in simplest form.

11. Define and give an example of an "improper fraction" and a "mixed number."

12. Write the answer is simplest form.

$$\begin{array}{r} 2\frac{11}{16} \\ +\ 7\ \frac{2}{3} \\ \hline \end{array}$$

13. Write the answer in simplest form.

$$\begin{array}{r} 10\ \frac{1}{6} \\ -\ 3\ \frac{4}{5} \\ \hline \end{array}$$

14. I picked $2\frac{5}{8}$ pounds of strawberries in the morning and $1\frac{3}{4}$ pounds after lunch. On the way home, I ate $\frac{5}{6}$ pound. How many pounds of strawberries did I have when I got home?

Diagnostic Test
Unit 5 Fractions: Multiplying & Dividing

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as the answers.

1. $\frac{3}{5} \times \frac{2}{7} =$

2. $\frac{1}{2} \times \frac{5}{6} =$

3. $\frac{2}{3}$ of 15 =

4. $\frac{1}{5}$ of $\frac{3}{4}$ =

In problems 5, 6 and 7 below, show how you can use "canceling" to make the multiplication easier.

5. $\frac{3}{4} \times \frac{6}{7} =$

6. $\frac{15}{24} \times \frac{18}{25} =$

7. $48 \times \frac{5}{8} =$

8. Change $5\frac{2}{3}$ to an improper fraction.

9. Change $12\frac{5}{6}$ to an improper fraction.

10. $3\frac{3}{4} \times 1\frac{2}{3} =$

11. Write the math definition of the word "reciprocal" and write an example that demonstrates what reciprocal means.

12. Write an example that shows how you use a reciprocal in dividing fractions.

Do the problems below, showing all your work:

13. $12 \div \frac{3}{4} =$

14. $\frac{7}{8} \div 4 =$

15. $\frac{2}{3} \div \frac{3}{4} =$

16. $\frac{5}{6} \div \frac{2}{3} =$

17. $9\frac{2}{3} \div 3\frac{1}{4} =$

18. $20 \div 5\frac{2}{5} =$

Do the word problems below, showing all your work:

19. $\frac{1}{4}$ of the students were over 16 years old. If there were 180 students, how many of them were over 16 years old?

20. I gathered $10\frac{3}{4}$ pounds of strawberries. My sister gathered $2\frac{1}{3}$ times as much as I did. How many pounds did she gather?

21. How many $3\frac{1}{2}$ foot-long leather belts can be cut from a strip of leather that is $24\frac{1}{2}$ feet long?

22. I have visited $\frac{7}{10}$ of the 50 states in the United States. How many states have I visited?

Diagnostic Test Unit 7 Decimals

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as the answers.

For questions 1–6, write the following as decimals.

1. $\frac{9}{100}$
2. $\frac{41}{100}$
3. $5\frac{7}{10}$
4. $\frac{4}{1000}$
5. $296\frac{17}{1000}$
6. $\frac{73}{10,000}$

For questions 7–11, write the decimals as fractions or mixed numbers and write how to say each fraction or mixed number.

7. 0.58
8. 100.1
9. 0.397
10. 8.0076
11. 79.651

For problems 12–17 do the addition or subtraction.

12. 5.267 + .0844 =
13. 295 + 20.097 =
14. 39.768 + 0.29 + 5 =
15. 743.657 – 59.9 =

16. 526 – 32.724 =

17. 19.1 – 3.754 =

For questions 18–20 do the multiplication. Do not round off your answers.

18. 7.24 × 8.59 =

19. 346 × 5.089 =

20. 4.19 × 10,000 =

For questions 21–23, do the division.

21. $7.4\overline{)412.92}$

22. $.75\overline{)21.3}$

23. $1{,}000\overline{)37}$

For questions 24 and 25, round your answers to the nearest hundredth.

24. 75.62 × 9.087 =

25. $4.67\overline{)2}$

For questions 26 and 27, change each fraction or mixed number to a decimal

26. $\frac{7}{20}$

27. $3\frac{5}{8}$

For questions 28 and 29, show how to write a repeating decimal.

28. $9\overline{)8.00}$

29. $18\overline{)11.00}$

Diagnostic Test
Unit 8 Metric Measurement

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

1. Use a ruler or meter stick and draw lines of the following length.
   a) 13 centimeters
   b) 109 millimeters
   c) 8 millimeters
2. (This problem is not done on paper.) With the instructor watching you, measure out a length of 2 meters.
3. Using a meter stick, draw a line that is 57.6 centimeters long.
4. Using a meter stick, draw a line that is 105.2 centimeters long.
5. 70.6 centimeters = _____ millimeters
6. 9 millimeters = _____ centimeters
7. 50 centimeters = _____ millimeters
8. 100 millimeters = _____ centimeters
9. 61 meters = _____ kilometers
10. 2,496 centimeters = _____ millimeters
11. 8 kilometers = _____ meters
12. 16.4 centimeters = _____ meters
13. 4.003 meters = _____ centimeters

14. Without using a ruler or meter stick, choose which measurement makes the most sense.

    a) Length of soccer field:

    9 meters 90 meters 900 meters

    b) Height of a paper coffee cup from Starbucks:

    1.4 centimeters 14 centimeters 140 centimeters

15. 0.06 kilograms = _____ grams

16. 30.9 grams = _____ kilograms

17. 107 grams = _____ milligrams

18. 37 milligrams = _____ grams

19. In each example, choose the measurement that makes the most sense.

    a) Weight of a paper cup filled with coffee:

    400 milligrams 400 grams 400 kilograms

    b) Weight of a piece of paper:

    5 milligrams 5 grams 5 kilograms

    c) Weight of a high school student:

    5 kilograms 50 kilograms 155 kilograms

    d) Weight of a textbook:

    1 kilogram 10 kilograms 100 grams

20. What is the definition of "volume"?

21. 12.06 liters = _____ milliliters

22. 24 milliliters = _____ liters

23. 1000 liters = _____ milliliters

24. 0.073 liters = _____ milliliters

25. 634 milliliters = _____ liters

26. In each example, choose the measurement that makes the most sense.

a) Volume of the largest size coffee at Starbucks:

59 milliliters 590 milliliters 5.9 liters

b) Volume of liquid in a spoon you would eat with:

15 milliliters 150 milliliters 1 liter

c) Volume of a can of soda:

35 milliliters 3.5 liters 355 milliliters

d) Volume of a plastic trash can in a school classroom:

490 milliliters 49 liters 2 liters

Diagnostic Test
Unit 9 Customary Measurement

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Use a ruler or yard stick and draw lines of the following length.

1. 5 inches

2. 1 foot 1 inch

3. 15 inches

4. $2\frac{7}{8}$ inches

5. 1 foot $6\frac{3}{16}$ inches

6. _____

   a) What is the length of the above line to the nearest $\frac{1}{2}$ in.?
   b) What is the length of the above line to the nearest $\frac{1}{4}$ in.?
   c) What is the length of the above line to the nearest $\frac{1}{8}$ in.?
   d) What is the length of the above line to the nearest $\frac{1}{16}$ in.?

7. (This problem is not done on paper.) With the instructor watching you, measure a length of 1 yard 1 foot 4 inches long.

Choose the measurement that makes the most sense.

8. Distance across the top of a coffee cup:

   $3\frac{1}{2}$ inches 10 inches 1 yard

9. Distance you can move if you take one big step:

   1 foot 1 yard 3 yards

10. How many feet and inches is the length in question 7?

11. How many total inches is the distance in question 7?

Use the table below and change the units in questions 12–14.

Customary units of distance

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

12. 19,536 feet = _____ miles _____ feet

13. 30 yards = _____ inches

14. Change 56 inches to feet and inches.

Use the table below and change the units in questions 15–17.

Customary units of weight

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

15. 3 pounds 10 ounces = _____ ounces

16. 99 ounces = _____ pounds _____ ounces

17. 6,160 pounds = _____ tons _____ pounds

Choose the measurement that makes the most sense.

18. Weight of a stapler:

6 ounces 6 pounds 26 pounds

19. Weight of a high school student:

12 pounds 120 pounds 120 tons

Use the table below and answer questions 20–22.

Customary units of volume

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

20. Change 64 fluid ounces to _____ pints.

21. 7 quarts = _____ cups

22. 48 fluid ounces = _____ quarts

Choose the measurement that makes the most sense.

23. Volume of water in a bathtub:

    30 fluid ounces 30 cups 30 gallons

24. Volume of a can of soda:

    12 fluid ounces 12 pints 12 quarts

Diagnostic Test
Unit 10 Positive and Negative Numbers

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

The instructor should observe to see that the student is able to do the problems without hesitating.

SET A

1. (+1) + (+1) =
2. (+9) + (+1) =
3. (0) + (+3) =
4. (–1) + (+2) =
5. (–5) + (+2) =
6. (–3) + (+3) =
7. (–5) + (+0) =
8. (+7) + (+3) =
9. (–4) + (+1) =
10. (–3) + (+4) =
11. (0) + (+9) =
12. (–6) + (+1) =
13. (–7) + (+8) =
14. (–9) + (+5) =
15. –2 + 0 =
16. –4 + +7 =
17. –8 + +3 =
18. –9 + +9 =
19. –3 + +2 =
20. –4 + +1 =
21. –5 + +7 =
22. +4 + +7 =

SET B

1. (+6) + (–5) =
2. (+7) + (–8) =
3. (+5) + (–4) =
4. (+3) + (–7) =
5. (–4) + (–1) =
6. (+1) + (–3) =
7. (–6) + (–6) =
8. (+4) + (–4) =
9. (0) + (–7) =
10. (+10) + (–6) =
11. (+1) + (–9) =
12. (+1) + (–1) =
13. (+3) + (–8) =
14. (+6) + (–9) =
15. –1 + –1 =
16. –2 + –5 =
17. +7 + –7 =
18. +6 + –3 =
19. –7 + –2 =
20. –5 + –5 =

SET C

1. (+10) – (+3) =
2. (+6) – (+1) =
3. (+3) – (+3) =
4. (+2) – (+4) =
5. (–2) – (+2) =
6. (–4) – (+6) =
7. (–6) – (+6) =
8. (+4) – (+4) =
9. (+8) – (0) =
10. (+5) – (+7) =
11. (0) – (+6) =
12. (–4) – (+1) =
13. (–5) – (+3) =
14. (+1) – (+4) =
15. +8 – +8 =
16. –3 – +6 =
17. +3 – +7 =
18. +2 – +6 =
19. –2 – +6 =
20. –5 – +5 =

SET D

1. (+2) – (–5) =
2. (+4) – (–3) =
3. (+6) – (–2) =
4. (–6) – (–4) =
5. (–1) – (–1) =
6. (–4) – (–6) =
7. (0) – (–5) =
8. (–4) – (–3) =
9. (–7) – (–7) =
10. (–9) – (–4) =
11. +2 – –7 =
12. –6 – –5 =
13. –3 – –9 =
14. –6 – –2 =
15. –9 – –3 =
16. –2 – –10 =

SET E

1. (+2) × (+3) =
2. (–5) × (–3) =
3. (–4) × (+6) =
4. (–3) × (–4) =
5. (+7) × (+2) =
6. (+5) × (–2) =
7. (–8) × (+2) =
8. (–2) × (–4) =
9. (+5) × (+3) =
10. (+9) × (–3) =
11. (–6) × (+5) =
12. (–7) × (–5) =
13. (+4) × (+4) =
14. (+3) × (–1) =
15. –6 × +1 =
16. –4 × –7 =
17. +7 × 0 =
18. –3 × +7 =
19. 0 × –5 =
20. –4 × –9 =
21. +3 × –10 =

SET F

1. (+9) ÷ (+3) =
2. (+7) ÷ (–1) =
3. (–16) ÷ (+2) =
4. (–20) ÷ (–5) =
5. (+10) ÷ (+2) =
6. (+32) ÷ (–4) =
7. (–35) ÷ (+5) =
8. (–12) ÷ (–2) =
9. (+15) ÷ (–5) =
10. (–24) ÷ (+6) =
11. (–20) ÷ (–4) =
12. (+18) ÷ (–3) =
13. (–12) ÷ (+4) =
14. (+21) ÷ (–7) =
15. +20 ÷ +5 =
16. –27 ÷ –9 =
17. +16 ÷ –2 =
18. 0 ÷ +3 =
19. –30 ÷ –5 =
20. 0 ÷ –1 =

Diagnostic Test
Unit 11 Simple Algebra

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

For #1–5, write an expression.

1. A loss of d dollars from a $500 savings account.

2. An increase of 29 above w.

3. 38 divided by x.

4. A discount of $50 from a usual price of x dollars.

5. k dollars divided into 15 shares.

6. I scored x points in the game. My brother scored 2.25 times more. Write an expression for how many points my brother scored.

7. In problem 6 above, how much did my brother score if I scored 8 points?

8. At a birthday party there were a total of 14 children. Write an expression for how many cookies each child would get if there were c cookies and each child got the same number.

9. Going to a movie costs $8.75 for the ticket and $4 for a box of popcorn. Write an expression for how much it would cost to buy one ticket and p boxes of popcorn.

10. In problem 9 above, how much does it cost to go to the movie and buy 3 boxes of popcorn?

11. Write an expression for how many months it would take to save $1,000 if you saved y dollars each month.

Solve each equation below and check your answer. Even if you can solve an equation in your head, write down the algebra steps you would do to get the solution. In these problems, we are checking on your ability to apply algebra.

12. $9 = p - 7$

13. $102 = 7r$

14. $\frac{t}{0.31} = 7.08$

15. $41.7 = 73.2x$

16. $\frac{n}{5} = -9$

17. $-6 = r + 17$

Solve the problems below by writing an equation and solving it. To have a correct answer, you must have a correct equation and the correct solution.

18. A runner ran 8 miles one day and 13 miles the next day. If he ran a total of 31 miles in 3 days, how many miles did he run on the third day?

19. A motorcycle weighs 173.25 kilograms. That is 18.3 times more than my bicycle. How much does my bicycle weigh?

20. A dance started at 8 PM. Between 8 PM and 9 PM, 29 more people arrived at the dance and no one left. At 9 PM, there were 208 people at the dance. How many people were there at 8 PM?

21. Thirteen people discovered a buried treasure and divided it up equally. They each got $16,207.43. How much money did they discover?

22. A store owner bought 17,500 plastic pens. She needs to collect $6,785 when these pens are sold in order to make the profit she needs. How much should she charge for each pen?

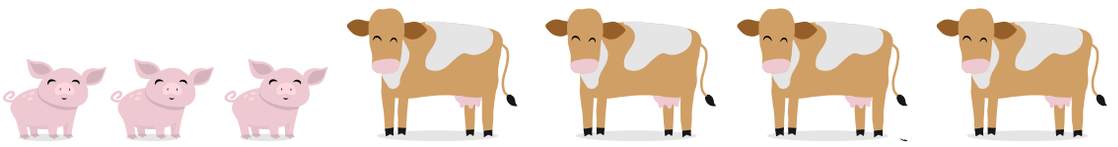
Diagnostic Test
Unit 12 Ratio, Proportion and Percent

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

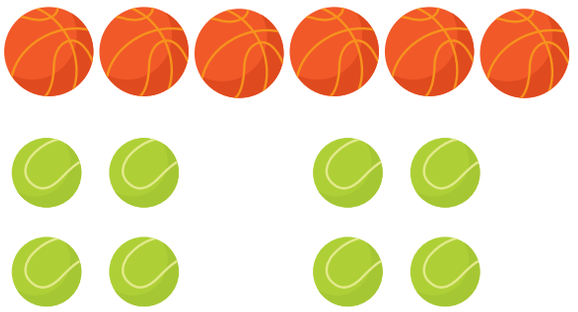
Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as to the answers.

For problems 1 and 2, write a ratio describing the pictures.

1.



2.



Complete the list of equal ratios below:

3. $\frac{\text{Cups of flour} \rightarrow}{\text{Cups of milk} \rightarrow}$ $\frac{5}{2} = \frac{10}{?} = \frac{?}{6} = \frac{20}{?}$

Find the missing number:

4. $\frac{11}{?} = \frac{19}{4.6}$

Solve this problem by writing a proportion and using cross products:

5. A school has 3 boys for every 2 girls. If there are 122 girls in the school, how many boys are there?

Use whatever method you would like to solve these problems:

6. I worked 3.5 hours and earned $29.75. How much would I earn if I worked 8 hours?

7. What is the unit price for pens if you can buy 12 pens for $6.99?

8. 400 people were asked what their favorite vacation spot was. 66 people said Disneyland. What percent of the people said Disneyland?

9. I took a test and got 85% right. There were 180 questions on the test. How many questions did I get right?

10. I took a test and got 138 questions right. This was 92% right. How many questions were on the test?

11. I shot a basketball 128 times and made 37.5% of my shots. How many shots did I make?

12. A coffee pot is being sold for $89.99. Sales tax is 8%. How much total must you pay for the coffee pot?

13. If an item costs $1.50 before sales tax and $1.59 with sales tax, what is the percent of sales tax?

14. A popcorn popper usually costs $60.00. If it is on sale for a discount of 12%, how much is its new price? If sales tax is 6.5%, how much do you have to pay to buy it today?

15. You borrow $6,500 at an interest rate of 14% per year, and you pay back the loan in 18 months. How much money do you have to pay back altogether?

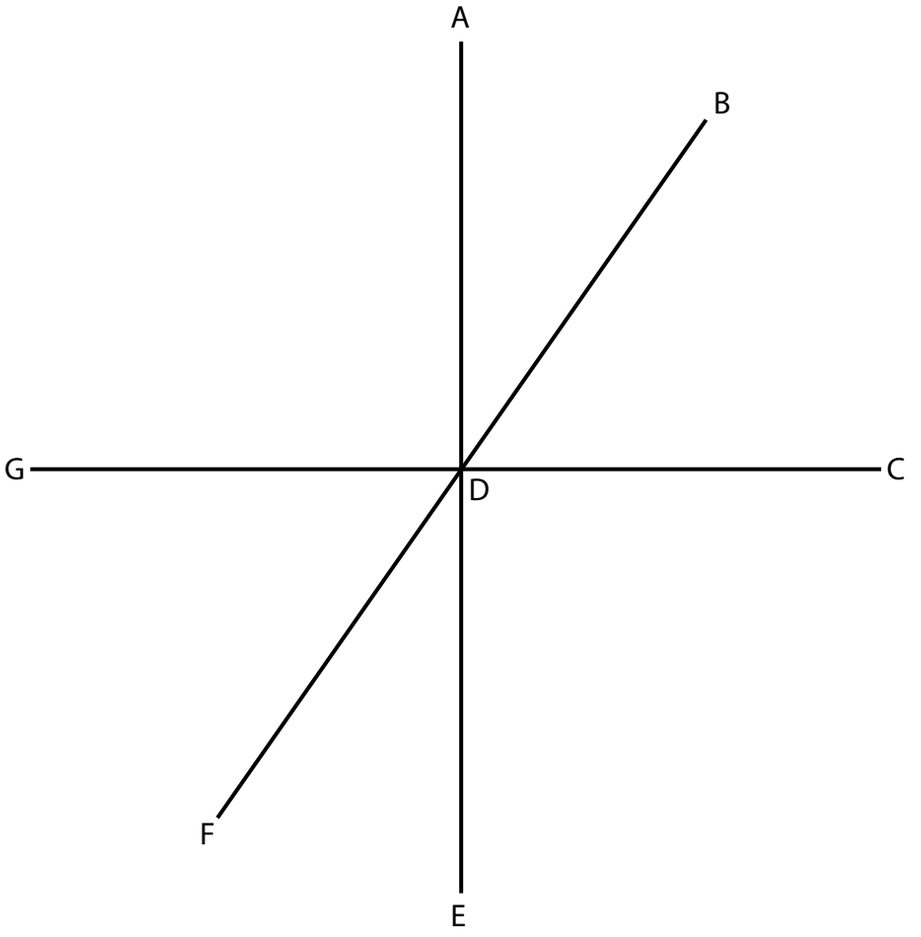
16. You earned $5,000 in 2011 and $27,500 in 2012. What is the percent of increase in your earnings?

Diagnostic Test
Unit 13 Simple Geometry

Purpose: to help the student and instructor determine what, if any, sections of this unit the student needs to study.

Do all the math work neatly on the test itself. The instructor will pay as much attention to the work as the answers.

Use the drawing below for problems 1, 2, 3 and 4.



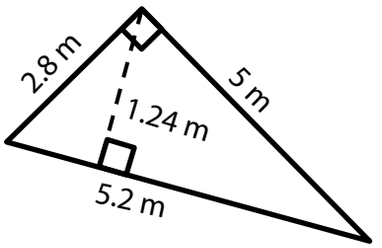
1. Use a protractor and measure ∠ADB.

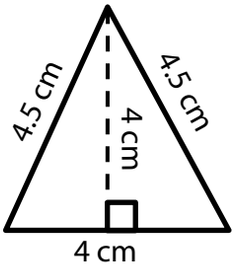
2. Use a protractor and measure ∠GDB.

3. Which angle is a 180° angle?

4. Name all the right angles in the drawing.

5. Below are two triangles. Calculate the perimeter of the right triangle.





Define the following words relating to circles.

6. diameter

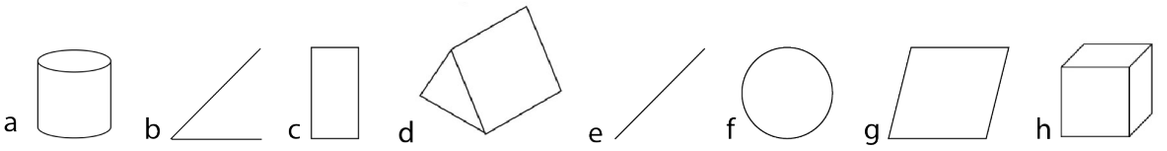
7. radius

8. circumference

9. pi (π)

10. A circle has a radius of 11.24 cm. Calculate the circumference of the circle.

11. Below each shape, write down whether that shape has 1 dimension, 2 dimensions or 3 dimensions.



12. What are perpendicular lines? Draw a sketch showing perpendicular lines.

13. What are parallel lines? Draw a sketch showing parallel lines.

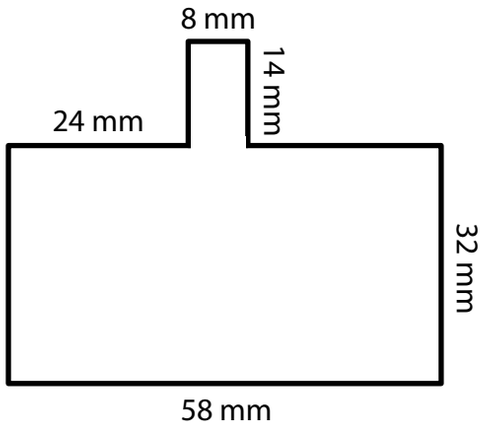
14. What does "9^2" mean? What number is it equal to?

15. What does "5 to the 4^{th} power" mean? What number is it equal to?

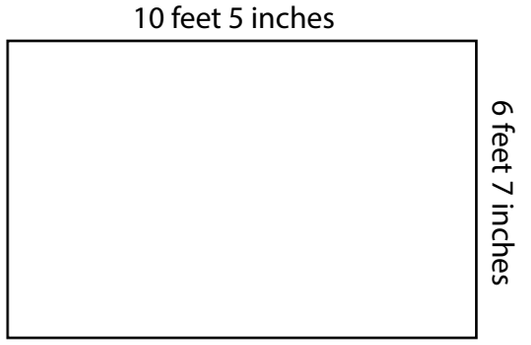
16. What does "8 cubed" mean? What number is it equal to?

17. What does "14 squared" mean? What number is it equal to?

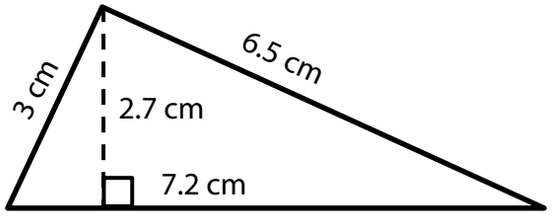
18. For the shape below, calculate the area (including the units for the area).



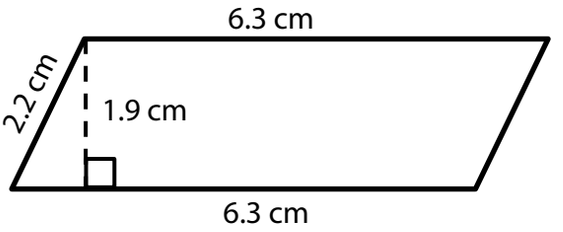
19. For the shape below, calculate the area (including the units of the area).



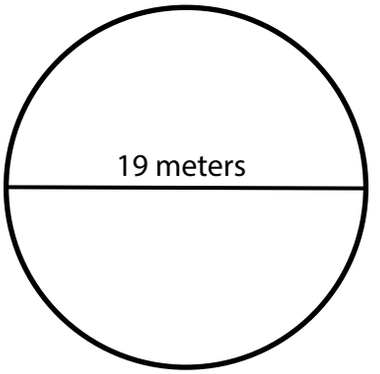
20. Find the area of the triangle below.



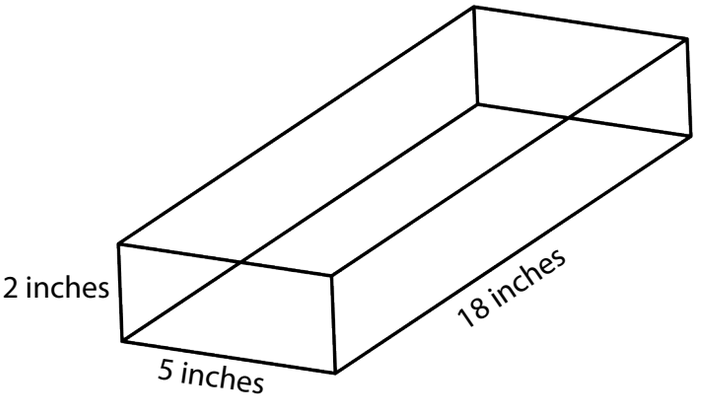
21. Find the area of the shape below.



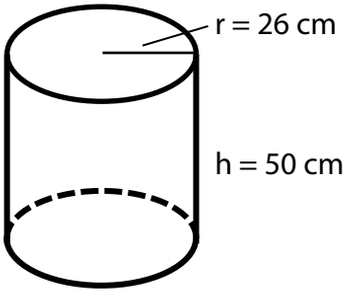
22. Find the area of the circle below.



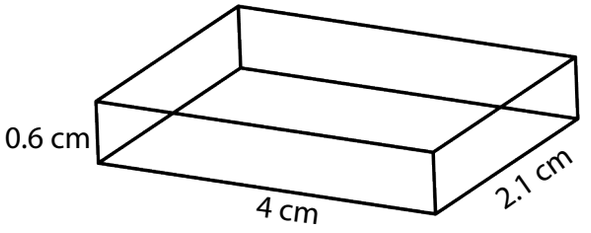
23. Calculate the surface area (including the units) of the shape below.



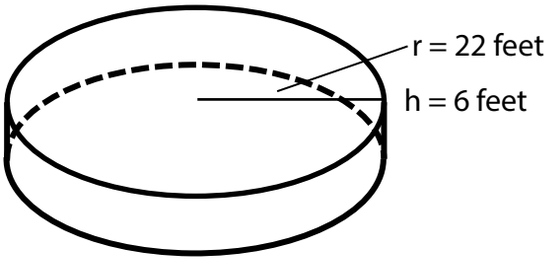
24. Calculate the surface area (including the units) of the shape below.



25. Find the volume (including the units) of the shape below.



26. Find the volume (including the units) of the shape below.



27. Find the length of the missing side of the triangle below. You may use a calculator.