Summer Review Work For Students Entering Pre-Algebra

The attached packet is being given as a review of math topics that you should be comfortable with. These will be necessary skills for success in Pre-Algebra class. Your packet will be collected during the first week of school. It will be graded on completeness and correctness. After giving you an opportunity to ask questions and get clarification, you will be assessed on this content. Please use a pencil and make sure to show relevant work. You will lose points if you fail to show the required work to reach the correct answers.

Please do not wait until the last day of vacation to get started! On the other hand, do NOT attempt to complete the packet during the first week of vacation. This packet is designed to maintain your current knowledge of math concepts sot that the topics discussed in the fall will be fresh in your mind.

If you have difficulties with the packet, use the examples given or feel free to search the internet for help on certain topics. Also, it may be beneficial to work with others.

Have an enjoyable summer!

I look forward to working with you this fall.

Ms. Ames

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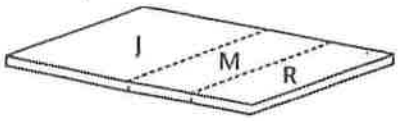
Basic Skills Practice

Fractions and Equivalent Fractions, Part 1

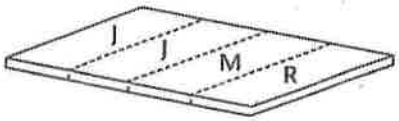
Fractions, as well as percentages and decimals, indicate a part of a whole.

Example: The picture represents a granola bar that Jennifer bought. She gives half to Michael. Michael gives half of his share to Raoul. How much of the granola bar does Raoul have? Divide the granola bar to represent each person's portion.



Because the portions of the granola bar are **not equal,** divide Jennifer's portion into 2 equal parts.

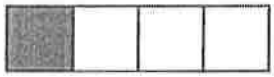
The parts are now equal, so you can find Raoul's portion.

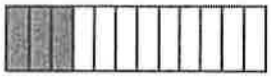


$$\text{Raoul's portion} = \frac{\text{Raoul's part}}{\text{Number of equal parts in the whole}}$$

Raoul has $\frac{1}{4}$ of the granola bar.

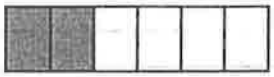
Write a fraction to show the amount of each shaded region.

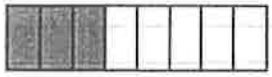
1.  _____

2.  _____

3.  _____

4.  _____

5.  _____

6.  _____

Write = for the fractions that are equivalent and ≠ for fractions that are not equivalent.

7. $\frac{2}{3}$ _____ $\frac{14}{21}$
8. $\frac{1}{9}$ _____ $\frac{2}{16}$
9. $\frac{5}{8}$ _____ $\frac{25}{80}$
10. $\frac{3}{11}$ _____ $\frac{12}{44}$
11. $\frac{12}{18}$ _____ $\frac{4}{6}$
12. $\frac{7}{9}$ _____ $\frac{63}{81}$

Complete each equivalent fraction.

13. $\frac{5}{25} = \frac{?}{5}$ _____
14. $\frac{2}{7} = \frac{?}{49}$ _____
15. $\frac{18}{66} = \frac{?}{11}$ _____
16. $\frac{3}{17} = \frac{?}{68}$ _____
17. $\frac{7}{56} = \frac{?}{8}$ _____
18. $\frac{4}{19} = \frac{?}{57}$ _____
19. $\frac{22}{48} = \frac{33}{?}$ _____
20. $\frac{9}{51} = \frac{15}{?}$ _____
21. $\frac{14}{4} = \frac{21}{?}$ _____

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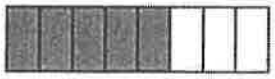
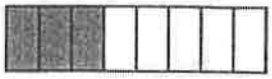
Basic Skills Practice

Comparing Fractions, Part 1

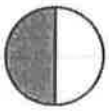
You can compare two fractions that have the *same* denominator by comparing their numerators.

Example: Compare $\frac{3}{8}$ and $\frac{5}{8}$. Since $5 > 3$, $\frac{5}{8} > \frac{3}{8}$. To see this, use a picture of each fraction.

$\frac{5}{8}$  $\frac{3}{8}$  $\frac{5}{8} > \frac{3}{8}$

You can compare two fractions that have *different* denominators by using several methods.

Method 1: Shade drawings and compare visually. Compare $\frac{1}{2}$ and $\frac{2}{5}$.

$\frac{1}{2}$  $\frac{2}{5}$  $\frac{1}{2} > \frac{2}{5}$

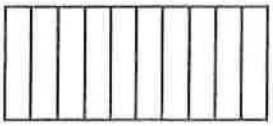
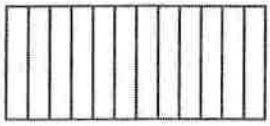
Method 2: To compare two fractions with the same numerator, compare denominators. Compare $\frac{3}{7}$ and $\frac{3}{8}$. Remember that if there are *fewer* divisions, each division is larger. So $\frac{3}{7} > \frac{3}{8}$.

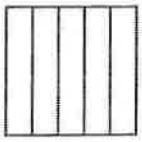
Method 3: Rewrite the fractions with a common denominator. Compare $\frac{2}{3}$ and $\frac{3}{5}$. Multiply the denominators to find a common denominator: $3 \times 5 = 15$.

$\frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$ $\quad \frac{3}{5} \times \frac{3}{3} = \frac{9}{15}$ $\quad \frac{10}{15} > \frac{9}{15}$ $\quad$ So $\frac{2}{3} > \frac{3}{5}$.

Shade the portion that each fraction represents. Then compare the fractions.

1. $\frac{1}{5}$  $\frac{2}{5}$  $\frac{1}{5}$ _____ $\frac{2}{5}$

2. $\frac{7}{10}$  $\frac{5}{12}$  $\frac{7}{10}$ _____ $\frac{5}{12}$

3. $\frac{5}{14}$  $\frac{3}{5}$  $\frac{5}{14}$ _____ $\frac{3}{5}$

Write =, < or > to compare each pair of fractions.

4. $\frac{2}{20}$ _____ $\frac{1}{5}$ **5.** $\frac{6}{15}$ _____ $\frac{2}{5}$ **6.** $\frac{18}{24}$ _____ $\frac{7}{8}$ **7.** $\frac{3}{5}$ _____ $\frac{7}{10}$

8. $\frac{2}{3}$ _____ $\frac{5}{6}$ **9.** $\frac{4}{17}$ _____ $\frac{3}{17}$ **10.** $\frac{3}{4}$ _____ $\frac{13}{16}$ **11.** $\frac{16}{19}$ _____ $\frac{80}{95}$

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Basic Skills Practice

Mixed Numbers, Part 1

Use mixed numbers when you have one (or more) whole units along with part of another unit.

Example:

1  1  $\frac{1}{3}$  $1 + 1 + \frac{1}{3} = 2\frac{1}{3}$

Rewrite mixed numbers as improper fractions by dividing each of the whole units into parts to match the partial unit. Then add all of the parts together.

   $\frac{3}{3} + \frac{3}{3} + \frac{1}{3} = \frac{7}{3}$

Here is a shortcut way to rewrite a mixed number as an improper fraction.

Step 1: Multiply the denominator by the whole number.

Step 2: Add the numerator to the product.

Step 3: Write the sum over the original denominator.

$$2\frac{1}{3} = \frac{(2 \times 3) + 1}{3} = \frac{7}{3}$$

Write each mixed number as an improper fraction.

1. $1\frac{2}{3}$ _____
2. $2\frac{1}{4}$ _____
3. $5\frac{1}{3}$ _____
4. $3\frac{1}{2}$ _____
5. $9\frac{3}{7}$ _____
6. $2\frac{5}{7}$ _____
7. $11\frac{5}{9}$ _____
8. $5\frac{2}{5}$ _____
9. $6\frac{1}{12}$ _____
10. $4\frac{3}{8}$ _____
11. $7\frac{5}{6}$ _____
12. $8\frac{2}{11}$ _____

Write each fraction as a whole number or mixed number in simplest form.

13. $\frac{22}{8}$ _____
14. $\frac{13}{6}$ _____
15. $\frac{13}{9}$ _____
16. $\frac{32}{7}$ _____
17. $\frac{24}{12}$ _____
18. $\frac{66}{8}$ _____
19. $\frac{14}{4}$ _____
20. $\frac{11}{2}$ _____
21. $\frac{27}{5}$ _____
22. $\frac{63}{9}$ _____
23. $\frac{56}{3}$ _____
24. $\frac{81}{4}$ _____

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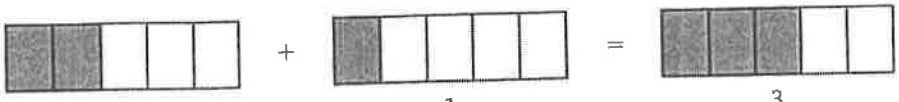
Basic Skills Practice

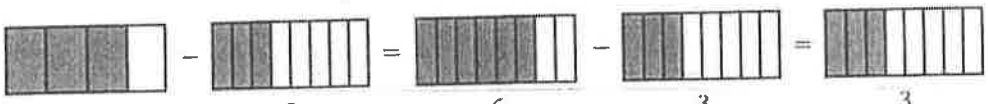
Adding and Subtracting Fractions, Part 1

To add or subtract fractions with a common denominator, add only the numerators.

Example 1: 

$\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$

To add or subtract fractions with different denominators, write as equivalent fractions with common denominators. Then perform the appropriate operation.

Example 2: 

$\frac{3}{4} - \frac{3}{8} = \frac{6}{8} - \frac{3}{8} = \frac{3}{8}$

To add or subtract mixed numbers, write as improper fractions. Then perform the appropriate operation.

Add. Write the sum in simplest form.

1. $\frac{2}{9} + \frac{5}{9}$ _____
2. $1\frac{7}{10} + 4\frac{2}{5}$ _____
3. $1\frac{2}{3} + \frac{11}{15}$ _____
4. $\frac{5}{8} + \frac{3}{4}$ _____
5. $\frac{1}{7} + \frac{3}{5}$ _____
6. $1\frac{5}{16} + 2\frac{13}{16}$ _____
7. $5\frac{2}{3} + 11\frac{5}{9}$ _____
8. $\frac{2}{4} + 6\frac{1}{12}$ _____
9. $5\frac{1}{3} + 4\frac{3}{8}$ _____

Subtract. Write the difference in simplest form.

10. $\frac{7}{11} - \frac{5}{11}$ _____
11. $2\frac{10}{13} - 1\frac{2}{3}$ _____
12. $1\frac{1}{9} - \frac{1}{3}$ _____
13. $\frac{55}{56} - \frac{7}{8}$ _____
14. $\frac{14}{15} - \frac{1}{2}$ _____
15. $2\frac{1}{5} - 2\frac{1}{10}$ _____
16. $\frac{9}{9} - \frac{1}{3}$ _____
17. $\frac{5}{9} - \frac{1}{4}$ _____
18. $\frac{5}{16} - \frac{1}{8}$ _____

Add or subtract. Write the solution in simplest form.

19. $2\frac{1}{2} + 6\frac{4}{5}$ _____
20. $\frac{1}{5} + \frac{3}{4}$ _____
21. $\frac{5}{6} - \frac{1}{8}$ _____
22. $6\frac{3}{4} - 4\frac{2}{3}$ _____
23. $1\frac{1}{6} - \frac{4}{5}$ _____
24. $3\frac{2}{5} + 5\frac{10}{10}$ _____
25. $\frac{2}{11} + \frac{7}{22}$ _____
26. $\frac{3}{5} - \frac{11}{30}$ _____
27. $7\frac{1}{6} + 9\frac{1}{2}$ _____

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Basic Skills Practice

Multiplying and Dividing Fractions, Part 1

To multiply fractions, write the problem on one line. Multiply the numerators, and then multiply the denominators.

Example 1: Method 1: Multiply first, and then simplify.

$$\frac{3}{14} \times \frac{2}{3} = \frac{3 \cdot 2}{14 \cdot 3} = \frac{6}{42} = \frac{1}{7}$$

Method 2: Cancel first, and then multiply.

$$\frac{3}{14} \times \frac{2}{3} = \frac{\cancel{3}^{1} \cdot \cancel{2}^{1}}{\cancel{14}_{7} \cdot \cancel{3}_{1}} = \frac{1}{7}$$

Dividing by a fraction is the same as multiplying by the fraction's reciprocal.

Recall that the *reciprocal* of a fraction $\frac{A}{B}$ is written as $\frac{B}{A}$.

Example 2: $\frac{3}{5} \div \frac{1}{3} = \frac{3}{5} \times \frac{3}{1}$ ←Rewrite $\div \frac{1}{3}$ as $\times \frac{3}{1}$.

$= \frac{9}{5}$ ←Multiply.

$= 1\frac{4}{5}$ ←Change to a mixed number.

Remember that when you write mixed numbers as improper fractions, they follow the same rules as fractions.

Multiply. Use either method 1 or method 2. Make sure the product is in its simplest form.

1. $\frac{2}{3} \times 9$ _____
2. $\frac{4}{7} \times \frac{3}{4}$ _____
3. $\frac{1}{9} \times \frac{3}{11}$ _____
4. $\frac{2}{5} \times \frac{3}{10}$ _____
5. $\frac{4}{25} \times 50$ _____
6. $\frac{1}{15} \times \frac{5}{6}$ _____
7. $2\frac{4}{5} \times \frac{1}{8}$ _____
8. $1\frac{7}{9} \times \frac{2}{3}$ _____
9. $3\frac{1}{2} \times 1\frac{6}{7}$ _____

Divide. Write the solution in its simplest form.

10. $\frac{1}{5} \div 5$ _____
11. $\frac{3}{5} \div \frac{2}{3}$ _____
12. $\frac{7}{8} \div \frac{1}{2}$ _____
13. $\frac{2}{11} \div \frac{1}{22}$ _____
14. $2\frac{4}{9} \div 2$ _____
15. $1\frac{2}{5} \div \frac{1}{6}$ _____
16. $\frac{5}{12} \div 1\frac{3}{7}$ _____
17. $5\frac{3}{5} \div \frac{1}{5}$ _____
18. $7\frac{1}{8} \div 2\frac{5}{7}$ _____

Multiply or divide. Write the solution in its simplest form.

19. $10 \div 3\frac{1}{3}$ _____
20. $\frac{4}{5} \times \frac{10}{11}$ _____
21. $1\frac{1}{5} \times 6\frac{2}{3}$ _____
22. $\frac{4}{5} \div \frac{24}{25}$ _____
23. $2\frac{3}{4} \times 1\frac{1}{4}$ _____
24. $5\frac{1}{3} \times 2\frac{1}{4}$ _____
25. $3\frac{4}{7} \times \frac{2}{5}$ _____
26. $\frac{8}{9} \div \frac{6}{36}$ _____
27. $\frac{11}{13} \div \frac{11}{52}$ _____

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Basic Skills Practice

Rounding Whole Numbers and Decimals, Part 1

To round a number to a given place, look at the digit to the right of that place. If it is less than 5, the digit stays the same. If it is 5 or greater, the digit is changed to the next higher digit. Rounding to the ones place is often referred to as rounding to the nearest whole number.

Example 1: Round 47,678 to the nearest thousand.

4<u>7</u>,678 ← Underline the number in the thousands place.
4<u>7</u>,678 ← Look at the digit to the right of the underlined digit; 6 is greater than 5.
4<u>8</u>,000 ← Round up by increasing the digit in the thousands place by 1 and changing all the digits to the right to zeros.

When rounding decimals, follow the same steps and drop the digits to the right of the given place.

Example 2: Round 5.942 to the nearest hundredth.

5.9<u>4</u>2 ← Underline the number in the hundredths place.
5.9<u>4</u>2 ← Look at the digit to the right; 2 is less than 5.
5.9<u>4</u> ← Keep the digit in the hundredths place the same. *Drop* the digits to the right of the hundredths place.

Round to the nearest hundred.

1. 4596 _____
2. 8327 _____
3. 15,209 _____
4. 96,785 _____

Round to the nearest thousand.

5. 4498 _____
6. 22,845 _____
7. 88,397 _____
8. 697,573 _____

Round to the nearest one or whole number.

9. 45.6 _____
10. 9.45 _____
11. 76.854 _____
12. 23.59 _____

Round to the nearest tenth.

13. 5.872 _____
14. 37.345 _____
15. 486.74 _____
16. 65.39 _____

Round to the nearest hundredth.

17. 6.543 _____
18. 45.386 _____
19. 0.767 _____
20. 16.452 _____

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Basic Skills Practice

Fractions, Decimals, and Percents, Part 1

A percent is another way to represent a fraction or a decimal.

Example 1: 25% of the student population participates in an after school sports program.

$$25\% = \frac{25}{100} = \frac{1}{4} \qquad 25\% = 25 \div 100 = 0.25$$

Example 2: Angie spent $\frac{1}{8}$ of her budget on movie tickets.

To change $\frac{1}{8}$ to a percent, first divide 1 by 8 to make an equivalent decimal, 0.125. Then multiply by 100 and add a percent sign.

$$\frac{1}{8} = 0.125 = 12.5\%$$

Write a fraction and a decimal for each percent.

1. 45% _____
2. 75% _____
3. 5% _____
4. 32% _____
5. 80% _____
6. 12% _____

Write a percent for each fraction or decimal.

7. $\frac{79}{100}$ _____
8. 0.82 _____
9. 0.07 _____
10. $\frac{26}{100}$ _____
11. $\frac{168}{100}$ _____
12. 0.11 _____

Write a percent for each fraction.

13. $\frac{1}{5}$ _____
14. $\frac{3}{10}$ _____
15. $\frac{1}{2}$ _____
16. $\frac{4}{25}$ _____
17. $\frac{9}{20}$ _____
18. $\frac{17}{50}$ _____

Solve each problem.

19. Ellen plans to finance her new car. The dealer offers an annual interest rate of 9.9%. The bank offers an annual interest rate of $9\frac{3}{4}$%. Which is the lower interest rate? _____

20. Juan won 26 of 40 games in a tennis tournament. What percent of the games did he win? _____

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Basic Skills Practice

Finding a Percent of a Number, Part 1

To find a percent of a number, change the percent to a decimal and multiply.

Example 1: A catcher's mitt is on sale for 33% off the original price of $45.00. How much money will be saved?

33% = 0.33 ←Change the percent to a decimal.

0.33 × 45 = 14.85 ←Multiply the decimal by the original amount.

33% of $45 is $14.85. This is the amount of savings.

Example 2: You buy a CD for $13.99. The sales tax is 8%. How much is the sales tax?

8% = 0.08 ←Change the percent to a decimal.

0.08 × 13.99 = 1.1192 ←Multiply the decimal by the amount of the item.

8% of $13.99 is $1.12 because you must round the number up. The sales tax is $1.12.

Compute.

1. What is 20% of 35? _____
2. What is 35% of 60? _____
3. What is 10% of 90? _____
4. What is 200% of 17? _____
5. What is 50% of 186? _____
6. What is 60% of 95? _____
7. What is 5% of 800? _____
8. What is 12% of 7300? _____
9. What is 33% of 142? _____
10. What is 67% of 15? _____
11. Find 6% of 895. _____
12. Find 32% of 96. _____
13. Find 25% of 260. _____
14. Find 75% of 192. _____
15. Find 150% of 16. _____
16. Find 60% of 90. _____
17. Find 40% of 80. _____
18. Find 55% of 20. _____
19. Find 3% of 300. _____
20. Find 12.5% of 72. _____

Solve each problem.

21. A farmer expects to increase his crop yield by 38%. If he harvested 285 bushels of corn last year, how many more bushels should he expect this year? _____

22. Beth sold a color enlargement in a wooden frame for $150. Sales tax is 8%. How much was the sales tax? _____

23. Lu makes $8.75 an hour. He is getting a 20% raise. How much will his raise be per hour? _____

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Basic Skills Practice

Graphing Points on a Coordinate Grid, Part 1

A coordinate grid is made up of the intersection of two lines. The vertical line is called the *y*-axis, and the horizontal line is called the *x*-axis. The lines intersect at the origin. The coordinates of the origin are (0, 0).

Example 1: Write the ordered pair for each point.

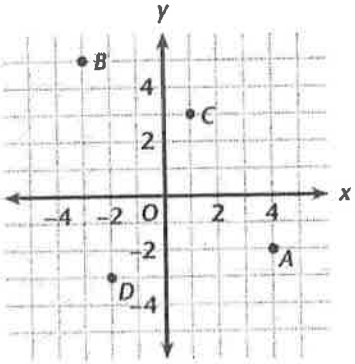
Point *A* From the origin, move right 4 units and down 2 units. The ordered pair is (4, −2).

Point *B* From the origin, move left 3 units and up 5 units. The ordered pair is (−3, 5).

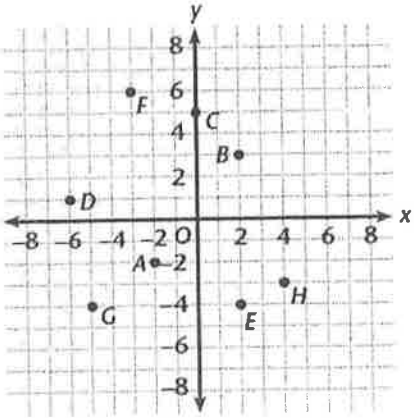
Example 2: Write the point named by each ordered pair.

(1, 3) From the origin, move right 1 unit and up 3 units. Point *C* is located at (1, 3).

(−2, −3) From the origin, move left 2 units and down 3 units. Point *D* is located at (−2, −3).

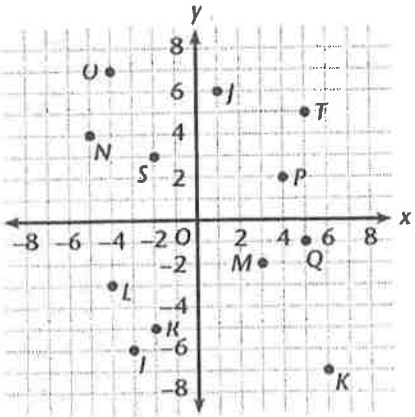


Use the coordinate grid at right for Exercises 1–8. Write the ordered pair.



1. point *A* _____
2. point *B* _____
3. point *C* _____
4. point *D* _____
5. point *E* _____
6. point *F* _____
7. point *G* _____
8. point *H* _____

Use the coordinate grid at right for Exercises 9–20. Write the point named by the ordered pair.



9. (6, −7) _____
10. (−3, −6) _____
11. (5, 5) _____
12. (−4, 7) _____
13. (−2, 3) _____
14. (1, 6) _____
15. (−4, −3) _____
16. (3, −2) _____
17. (−2, −5) _____
18. (4, 2) _____
19. (5, −1) _____
20. (−5, 4) _____

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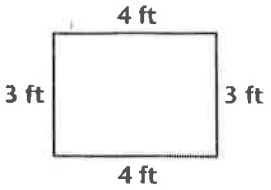
Basic Skills Practice

Finding Perimeter and Using the Distance Formula, Part 1

To find the perimeter, add each length to find the total distance around the outside of a figure.

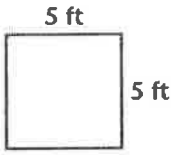
Example 1: Find the perimeter of the rectangle shown.
Add the length of all sides to get the total.
$P = 3 \text{ ft} + 4 \text{ ft} + 3 \text{ ft} + 4 \text{ ft}$
$P = 14 \text{ ft}$



To find the distance that an object travels, multiply its rate of speed by the length of time that it travels.

Example 2: How far will a truck go in 4 hours at 60 mph?
$d = rt$ → Write the formula (d = distance, r = rate, t = time).
$d = 60(4)$ → Substitute the given values ($r = 60$, $t = 4$).
$d = 240$ → Multiply.
The truck will go 240 miles.

Find the perimeter.

1. 

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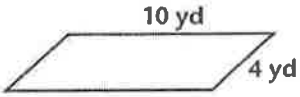
2. 

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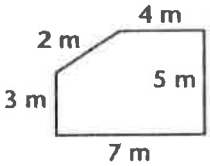
3. 

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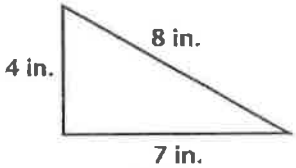
4. 

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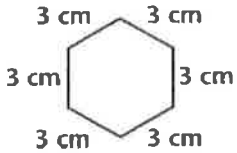
5. 

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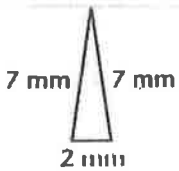
6. 

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Find the missing amount. If necessary round the answers to the nearest hundredth.

7. $r = 50$ mph, $t = 6$ h, $d =$ _____ mi

8. $r = 32$ mph, $t = 4.5$ h, $d =$ _____ mi

9. $r = 475$ mph, $t =$ _____ h, $d = 2150$ mi

10. $r =$ _____ mph, $t = 1.5$ h, $d = 70.25$ mi

11. $r = 66$ mph, $t = 0.8$ h, $d =$ _____ mi

12. $r = 105$ mph, $t =$ _____ h, $d = 43$ mi

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Basic Skills Practice

Areas of Triangles, Rectangles, and Squares, Part 1

Area is the number of square units needed to cover the surface of a plane figure.

Example 1: To find the area of a rectangle multiply the length by the width.
Using the formula, $A = l \times w$, let $l = 4$ ft and $w = 3$ ft.

$$A = 4 \text{ ft} \times 3 \text{ ft}$$
$$A = 12 \text{ ft}^2$$

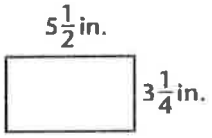
Example 2: To find the area of a square, square the length of one side.
Using the formula, $A = s^2$, let $s = 3$ m.

$$A = 3 \text{ m} \times 3 \text{ m}$$
$$A = 9 \text{ m}^2$$

Example 3: To find the area of a triangle multiply one-half of the base times the height.
Using the formula, $A = \frac{1}{2}bh$, let $b = 3$ ft and $h = 4$ ft.

$$A = \frac{1}{2}(3 \text{ ft})(4 \text{ ft})$$
$$A = 6 \text{ ft}^2$$

Find the area of each rectangle.

1. 

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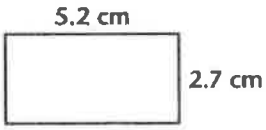
2. 

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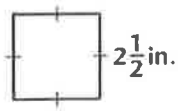
3. $l = 9\frac{1}{4}$ yd, $w = 3\frac{1}{2}$ yd _____

4. $l = 4.4$ mm, $w = 2.9$ mm _____

Find the area of each square.

5. 

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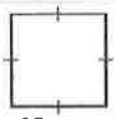
6. 

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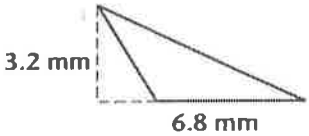
7. $s = 7.8$ cm _____

8. $s = 16$ in. _____

Find the area of each triangle.

9. 

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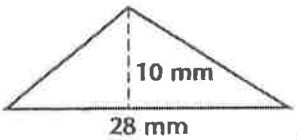
10. 

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11. $b = 11$ cm, $h = 23$ cm _____

12. $b = 4.5$ in., $h = 6.5$ in. _____

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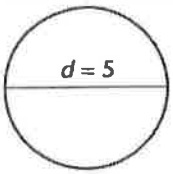
Basic Skills Practice

Circumference and Area of Circles, Part 1

Circumference is the distance around a circle. To find the circumference, multiply the length of the diameter by π. Diameter is the distance across the circle and π is approximately 3.14.

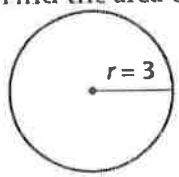
Example 1: Find the circumference of the circle.



$C = \pi d$ → Write the formula.
$C \approx 3.14(5)$ → Substitute given values.
$C \approx 15.7$ → Multiply.

To find the area of a circle, multiply π by the square of the radius (r^2). Remember that the radius is half the diameter of a circle.

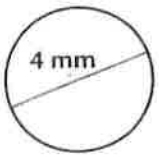
Example 2: Find the area of the circle.



$A = \pi r^2$ → Write the formula.
$A \approx 3.14(3)(3)$ → Substitute given values.
$A \approx 28.26$ → Multiply.

Find the circumference for each circle.

1.



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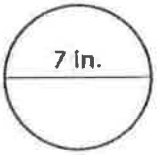

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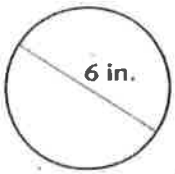

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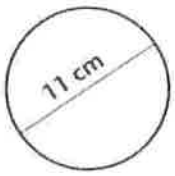

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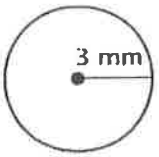
Find the area for each circle.

5.



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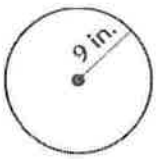

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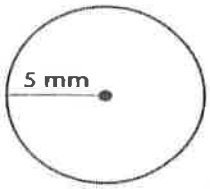

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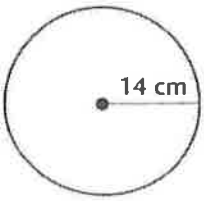

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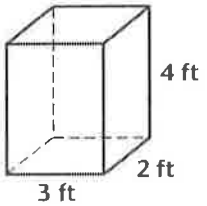
NAME _____ CLASS _____ DATE _____

Basic Skills Practice

Surface Area and Volume, Part 1

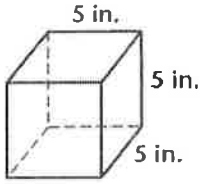
The amount of material needed to cover an object is known as its surface area. Volume is the number of nonoverlapping unit cubes that will fill the interior of a solid.

Example 1: Find the area and volume of the rectangular box.



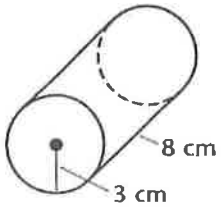
- Find the area of each face.
  Use $A = l \times w$.
  Top and bottom: $3 \times 2 = 6\ \text{ft}^2$ each
  Front and back: $3 \times 4 = 12\ \text{ft}^2$ each
  Sides: $4 \times 2 = 8\ \text{ft}^2$ each
- Add the area of each face.
  $SA = (2 \times 6\ \text{ft}^2) + (2 \times 12\ \text{ft}^2) + (2 \times 8\ \text{ft}^2) = 52\ \text{ft}^2$
- Use the formula $V = lwh$ to find the volume.
  $V = (2\ \text{ft})(3\ \text{ft})(4\ \text{ft}) = 24\ \text{ft}^3$

Example 2: Find the surface area and volume of the cube.



- Find the area of one face.
  Use $A = s^2$.
- Since all the faces are the same, multiply the area of one face by the total number of faces (6).
  $SA = 6(25\ \text{in.}^2) = 150\ \text{in.}^2$
- Use the formula $V = s^3$ to find the volume.
  $V = (5\ \text{in.})^3 = 125\ \text{in.}^3$

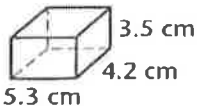
Example 3: Find the lateral surface area (curved part without ends) and the volume of the cylinder.



- Use $SL = 2\pi rh$.
  $SL = 2\pi(3\ \text{cm})(8\ \text{cm}) = 2\pi(24)\ \text{cm}^2 = 48\pi\ \text{cm}^2$
- If it is necessary to eliminate π, then use $\frac{22}{7}$.
  $SL = 48\left(\frac{22}{7}\right)\ \text{cm}^2 \approx 151\ \text{cm}^2$
- Use the formula $V = \pi r^2 h$ to find the volume.
  $V = \pi(3\ \text{cm})^2(8\ \text{cm}) = \pi(9\ \text{cm}^2)(8\ \text{cm}) = 72\pi\ \text{cm}^3$ or $226\ \text{cm}^3$

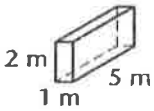
Find the surface area and volume of each solid figure. If necessary round the answers to the nearest tenth.

1.



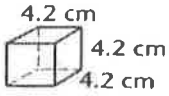
Surface area: _____ Volume: _____

2.



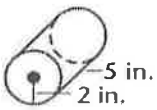
Surface area: _____ Volume: _____

3.



Surface area: _____ Volume: _____

4.



Lateral SA: _____ Volume: _____

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Basic Skills Practice

Probability, Part 1

The probability of an event is the likelihood that the event will occur. When an event is certain to occur, it has a probability of 1. When an event is certain not to occur, it has a probability of 0. When an event is equally likely to occur or not occur, it has a probability of $\frac{1}{2}$, or 0.5.

The probability (P) that an outcome will occur is the ratio of the number of successful outcomes to the number of possible outcomes:

$$P = \frac{\text{successful outcomes}}{\text{possible outcomes}}$$

When you toss a coin, there are two possible outcomes, heads or tails.
The chances of tossing tails are $\frac{\text{successful outcomes}}{\text{possible outcomes}} = \frac{\text{tails}}{\text{heads or tails}} = \frac{1}{2}$.

Example 1: When rolling a number cube, what is the probability of getting a 3?
successful outcomes: 3
possible outcomes: 1, 2, 3, 4, 5, 6

$$P = \frac{\text{number of successful outcomes}}{\text{number of possible outcomes}} = \frac{1}{6}$$

Example 2: When rolling a number cube, what is the probability of getting an even number?
successful outcomes: 2, 4, 6
possible outcomes: 1, 2, 3, 4, 5, 6

$$P = \frac{3}{6} = \frac{1}{2}$$

Exercises 1–4 refer to one roll of a number cube.

1. What is the probability of getting an even number? _____
2. What is the probability of getting a 3 or a 5? _____
3. What is the probability of getting a multiple of 3? _____
4. What is the probability of getting 7? _____

Exercises 5–8 refer to a bag filled with 3 yellow balls, 4 green balls, 2 blue balls, and 1 orange ball.

5. What is the probability of picking a red ball out of the bag? _____
6. What is the probability of picking a blue or yellow ball? _____
7. What is the probability of picking an orange ball? _____
8. What is the probability of picking a green ball? _____
9. What is the probability of picking a green or orange ball? _____

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Basic Skills Practice

Statistics: Mean and Range, Part 1

The mean or average is the sum of the data divided by the number of pieces of data.

The range of a set of data is the difference between the greatest value and the least value.

Example: Jonathan has taken 4 quizzes in math in this six-weeks period. His scores are 90, 85, 73, and 80. Find the mean and the range of Jonathan's scores.

Find the mean.
1. Add the scores.
   $90 + 85 + 80 + 73 = 328$
2. Divide by the number of scores.
   $328 \div 4 = 82$

The mean is 82.

Find the range.
Subtract the least score (73) from the greatest score (90).
$90 - 73 = 17$

The range is 17.

Find the mean of each group of numbers.

1. 98, 72, 80, 84, 91 _____

2. 3, 0.8, 2.6, 8.4, 9.2 _____

3. 45, 31, 42, 67, 60 _____

4. 5, 1.5, 3.4, 4, 6.1 _____

Find the range of each group of numbers.

5. 56, 68, 57, 72, 70 _____

6. 6.4, 5.7, 4.3, 6.3 _____

7. 40, 45, 47, 52, 65 _____

8. 2.7, 3.2, 4.3, 5.8 _____

Solve each problem.

9. Leo took 6 math tests. His scores were 69, 89, 92, 94, 88, and 90. Find the range and the mean for Leo's scores. _____

10. Juanita works as a volunteer. In the last 4 weeks she worked 10 hours, 14 hours, 12 hours, and 4 hours. On the average, how many hours per week did she work? _____

11. Daniel needs an average of at least 20 points to enter the final round of a contest. So far he has accumulated 104 points in 5 events. How many points does he need in the last event to qualify for the final round? _____

12. Emilie and her brother Joel went on a bicycling trip to Colorado. They traveled a total of 150 miles in 5 days. What was the average number of miles traveled per day? _____

NAME _____ CLASS _____ DATE _____

Basic Skills Practice

Statistics: Mean and Mode, Part 1

Recall that the mean or average is the sum of the data divided by the number of pieces of data. The mode is the piece of data that appears most often in a data list. There may be one mode, more than one mode, or no mode. The mode is useful when data pieces are not numerical.

Example: Find the mode of the following data lists:

1. 95, 80, 92, 91, 98, **94, 94** The mode is 94 because 94 appears most often.
2. **4, 5, 5, 4,** 6 The modes are 4 and 5 because 4 and 5 appear most often.
3. 99, 100, 101 There is no mode because no number appears more often than another.

The chart shows the hours that Sara spent working in a flower shop for a one-week period.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	7	6.5	8.5	7	8	3

1. What is the mode of the number of hours that Sara worked? _____
2. What is the mean (average) number of hours that Sara worked? _____

Find the mean and mode for the following data lists. If necessary, round to the nearest tenth.

3. 2, 5, 6, 7, 4, 6 Mean _____ Mode _____
4. 8, 5, 12, 3, 4, 5, 14, 5 Mean _____ Mode _____
5. 80, 65, 78, 72 Mean _____ Mode _____
6. 2, 3, 2, 2, 5, 3, 3 Mean _____ Mode _____
7. 1, 2, 3, 4, 5, 6 Mean _____ Mode _____

In the 100-yard dash, 5 runners had these times: 10.4 seconds, 11.2 seconds, 10.6 seconds, 12.1 seconds, and 11.2 seconds.

8. What was the mean time? _____
9. What was the mode of the times? _____
10. What was the range of the times? _____

Name _____ Date _____ Class _____

LESSON 1-2

Practice

Exponents

Name the base and the exponent for each of the following. The first one is done for you.

1. 7^2

   base 7

   exponent 2

2. 5^4

   base _____

   exponent _____

3. 6^8

   base _____

   exponent _____

Write using exponents. The first one is done for you.

4. 4×4

   4^2

5. $2 \times 2 \times 2$

   _____

6. 10×10

   _____

7. $5 \times 5 \times 5 \times 5$

   _____

8. $3 \times 3 \times 3 \times 3$

   _____

9. $8 \times 8 \times 8 \times 8 \times 8$

   _____

Write as repeated multiplication. The first one is done for you.

10. 6^2

    6×6

11. 5^3

    _____

12. 2^5

    _____

13. How many different ways can you use the digits 3 and 5 to write expressions in exponential form? What are the expressions?

    _____

Name _____ Date _____ Class _____

LESSON 1-2

Problem Solving

Exponents

1. The surface temperature of the Sun is close to 10,000°F. Write 10,000 using exponents.

   Solution:
   Move the decimal point to the left so the number is between 0 and 10.
   10,000 ⟶ 1.0000
   The decimal point moved 4 places.
   Use 4 as the exponent.
   1.0×10^4

2. Patty Berg has won 4^2 major women's titles in golf. Write 4^2 in standard form.

   The exponent 2 means to write the base _____ as a factor 2 times:

   _____ × _____ = _____

3. William has 3^3 baseball cards and 4^3 football cards. Write the number of baseball cards and footballs cards that William has.

   _____

   _____

4. Michelle used the following expression to represent the total number of miles she ran each day last year:
   $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$. Write this expression using exponents. How many miles did Michelle run last year?

   _____

Choose the letter for the best answer.

5. Cell A divides every 30 minutes. If you start with two cells, how many cells will you have in 3 hours?

   A 6 cells
   B 32 cells
   C 128 cells

6. A soccer team has a phone tree in case a soccer game is cancelled. The coach calls 2 families. Then each family calls 2 other families. How many families will be notified during the 4th round of calls?

   A 2 families
   B 4 families
   C 16 families

7. The Akashi-Kaiko Bridge is the longest suspension bridge in the world. It is about 3^8 feet long. Write the approximate length of the Akashi-Kaiko Bridge in standard form.

   A 6,561 feet
   B 2,187 feet
   C 24 feet

8. The Strahov Stadium is the largest sports stadium in the world. Its capacity is about 12^5 people. Write the capacity of the Strahov Stadium in standard form.

   A 144 people
   B 20,736 people
   C 248,832 people

Name _____ Date _____ Class _____

LESSON 2-1

Problem Solving

Variables and Expressions

Write the correct answer.

1. To cook 4 cups of rice, you use 8 cups of water. To cook 10 cups of rice, you use 20 cups of water. Write an expression to show how many cups of water you should use if you want to cook *c* cups of rice. How many cups of water should you use to cook 5 cups of rice?

   Solution:
   For *c* cups of rice:

   $$\frac{4 \text{ cups rice}}{8 \text{ cups water}} = \frac{10}{20} = \frac{1}{2}$$

   $$\frac{c}{?} = \frac{1}{2}, \quad \frac{c}{2c} = \frac{1}{2}.$$

   You need $2c$ cups of water to cook *c* cups of rice.

   For 5 cups of rice:

   $$\frac{5}{?} = \frac{1}{2}, \quad \frac{5}{10} = \frac{1}{2}.$$

   You need 10 cups of water.

2. Sue earns the same amount of money for each hour that she works. In 3 hours, she earns $27. In 8 hours, she earns $72. Write an expression to show how much money Sue earns working *h* hours. At this rate, how much money will Sue earn if she works 12 hours?

   $3h = \$27$

   $8h = \$72$

   $h =$ _____

   For *h* hours she makes _____

   For 12 hours she makes _____ or _____

Circle the letter of the correct answer.

3. In 2005, 1 United States dollar was worth 28 Russian rubles. How many rubles were equivalent to 10 United States dollars?

   1 US dollar = 28 rubles
   10 US dollars = ? rubles

   A 28
   B 280
   C 2,800

4. In 2005, 1 United States dollar was worth 10 Mexican pesos. How many pesos were equivalent to 5 United States dollars?

   1 US dollar = 10 pesos
   5 US dollars = ? pesos

   A 10
   B 15
   C 50

Name _____ Date _____ Class _____

LESSON 2-1

Practice

Variables and Expressions

Circle the letter of the correct answer.

algebraic expression: phrase that contains numbers, operations, and variables

1. Which of the following is an algebraic expression?
   A $10 \cdot (3 - 2)$
   B $15 \div 5$
   C $9 - n$

2. What is the variable in the expression $(16 + a) \cdot 5 - 4$?
   A 16
   B a
   C n

3. Which of these expressions is a way to rewrite the algebraic expression $n \div 3$?
   A $\frac{n}{3}$
   B $n \cdot 3$
   C $\frac{3}{n}$

Evaluate each expression to find the missing values in the tables.

evaluate: find the value of

$2^2 = 4$

4.

n	$n + 3$
1	4
2	
5	
7	
10	

5.

n	$n \cdot 2^2$
2	8
3	
5	
7	
8	

6. If $x = 3$, what is the value of the expression $6 \div x$?

_____

7. If $x = 2$, what is the value of the expression $9 - x$?

_____

Name _____ Date _____ Class _____

LESSON 7-1

Problem Solving

Ratios and Rates

Use the table to answer each question.
The first one is done for you.

Atomic Particles of Elements

Element	Protons	Neutrons	Electrons
Gold	79	118	79
Iron	26	30	26
Neon	10	10	10
Platinum	78	117	78
Silver	47	61	47
Tin	50	69	50

1. What is the ratio of gold protons to silver protons?

   There are **79** gold protons and **47** silver protons. So the ratio is **79 : 47**

2. What is the ratio of gold neutrons to platinum protons?

   There are ____ gold neutrons and ____ platinum protons. So the ratio is _____ : _____

3. What are two equivalent ratios of the ratio of neon protons to tin protons?

   _____

   _____

4. What are two equivalent ratios of the ratio of iron protons to iron neutrons?

   _____

   _____

Circle the letter of the correct answer.

5. A ratio of one element's neutrons to another element's electrons is equivalent to 3 to 5. What are those two elements?
   - A iron neutrons to tin electrons
   - B gold neutrons to tin electrons
   - C tin neutrons to gold electrons

6. The ratio of two elements' protons is equivalent to 3 to 1. What are those two elements?
   - A gold to tin
   - B neon to tin
   - C platinum to iron

7. Which element in the table has a ratio of 1 to 1, no matter what parts you are comparing in the ratio?
   - A iron
   - B neon
   - C tin

8. If the ratio for every element is 1:1, which two parts is the ratio comparing?
   - A protons to neutrons
   - B electrons to neutrons
   - C protons to electrons

Name _____ Date _____ Class _____

LESSON 7-1

Practice

Ratios and Rates

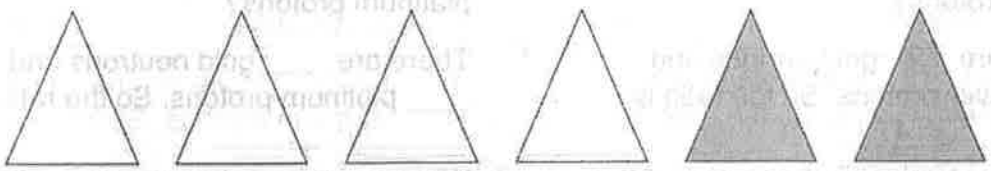
Use the table to write each ratio. The first one is done for you.

1. angel fish to tiger barbs **4:5**
2. red-tail sharks to clown loaches _____
3. catfish to angel fish _____
4. clown loaches to tiger barbs _____
5. catfish to red-tail sharks _____

Caroline's Pet Fish	
Tiger Barbs	5
Catfish	1
Angel fish	4
Red-tail sharks	1
Clown loaches	3

6. Write three equivalent ratios to compare the number of gray triangles in the picture with the total number of triangles.

_____



Use the table to write each ratio. The first one is done for you.

7. gray male kittens to gray female kittens

   2:5

8. white female kittens to white male kittens

_____

Caroline's Kittens		
	White	**Gray**
Male	3	2
Female	5	5

Name _____ Date _____ Class _____

LESSON 7-3

Practice

Proportions

Find the missing value in each proportion.

1. $\frac{1}{2} = \frac{n}{6}$

Solution:

Find cross products.

$6 \cdot 1 = 2 \cdot n$

$6 = 2n$

$3 = n$

2. $\frac{6}{9} = \frac{n}{3}$

Cross multiply:

$\frac{6}{9} \times \frac{n}{3}$

3. $\frac{n}{14} = \frac{2}{7}$

_____ _____

4. $\frac{2}{3} = \frac{6}{n}$

5. $\frac{n}{5} = \frac{12}{15}$

6. $\frac{2}{n} = \frac{1}{6}$

_____ _____ _____

7. $\frac{10}{2} = \frac{n}{4}$

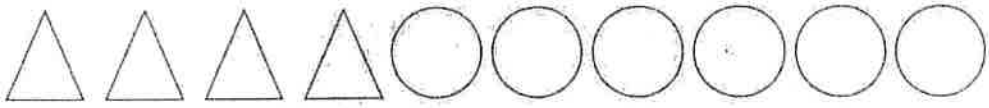
8. $\frac{1}{4} = \frac{2}{n}$

9. $\frac{16}{8} = \frac{n}{4}$

_____ _____ _____

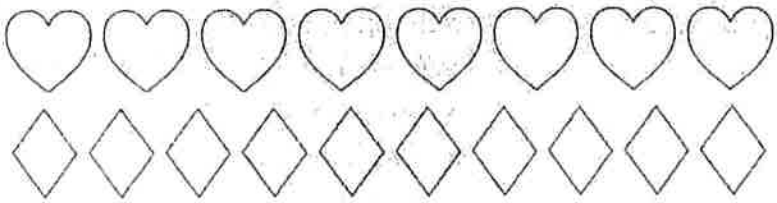
Write a proportion for each model. The first one is done for you with a possible answer.

10.



$\frac{4}{6} = \frac{2}{3}$

11.



_____

Name _____ Date _____ Class _____

LESSON 7-3

Problem Solving

Proportions

Write the correct answer. The first one is done for you.

1. The ratio of an object's weight on Earth to its weight on the Moon is 6:1. The first person to walk on the Moon weighed 165 pounds on Earth. How much did he weigh on the Moon?

   Solution:

   $\frac{6}{1} = \frac{165}{x}$

   $6x = 165$

   $x = 27.5$ pounds

2. For most people, the ratio of the length of their head to their total height is 1:7. Use proportions to test your measurements and see if they match this ratio.

   _____

   _____

Circle the letter of the correct answer.

3. A healthy diet has a ratio for meat to vegetables of 2.5 servings to 4 servings. If you eat 7 servings of meat a week, how many servings of vegetables should you eat?

   A 28 servings

   B 17.5 servings

   C 11.2 servings

4. A 150-pound person will burn 100 calories while sitting still for 1 hour. Using this ratio, how many calories will a 100-pound person burn while sitting still for 1 hour?

   A $666\frac{2}{3}$ calories

   B $66\frac{2}{3}$ calories

   C $6\frac{2}{3}$ calories

5. At one time, 1 U.S. dollar was worth 1.58 in euros. If you exchanged $25 at that rate, how many euros would you get?

   A 39.50 euros

   B 15.82 euros

   C 26.58 euros

6. At one time, 1 U.S. dollar was worth 0.69 English pound. If you exchanged 500 English pounds, how many dollars would you get?

   A 345 U.S. dollars

   B 725 U.S. dollars

   C 500.69 U.S. dollars

Name _____ Date _____ Class _____

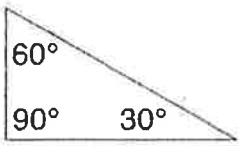
LESSON 8-5

Practice

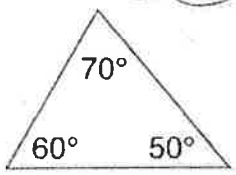
Triangles

Classify each triangle as acute, obtuse, or right.
The first one is done for you.

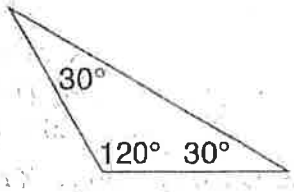
Any angle 90° or more?

1. 

right

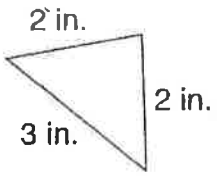
2. 

_____

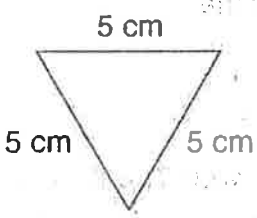
3. 

_____

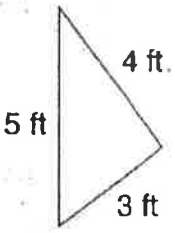
Classify each triangle as scalene, isosceles, or equilateral.
The first one is done for you.

4. 

isosceles

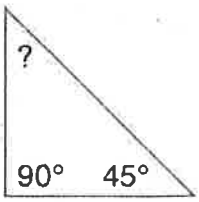
5. 

_____

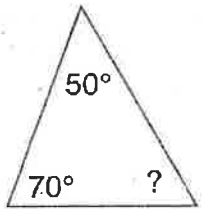
6. 

_____

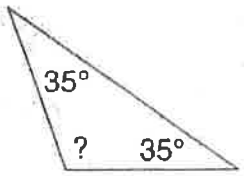
Find the measure of the unknown angle.
The first one is done for you.

7. 

45°

8. 

_____

9. 

_____

10. One side of an equilateral triangle measures 4 cm. What are the lengths of the other two sides of the triangle?

_____

Name _____ Date _____ Class _____

LESSON 8-5

Problem Solving

Triangles

Use the triangle diagram to answer each question.

1. Classify triangle *ABC*. What is the measure of the missing angle?

   Solution:

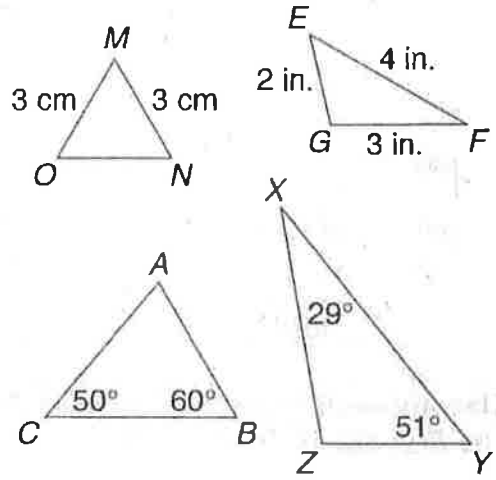
   ΔABC is an acute triangle.
   The sum of the measures of the angles of a triangle is 180°.
   $180° - (50° + 60°) = 70°$

2. Classify triangle *XYZ*. What is the measure of the missing angle?

   _____

3. If triangle *MNO* is an equilateral triangle, what is the measure of the missing side?

   _____



Circle the letter of the correct answer. The first one is done for you.

4. What is the complement of $\angle XYZ$?
   - (A) 39°
   - B 51°
   - C 129°

5. Classify triangle *EFG*.
   - A scalene triangle
   - B isosceles triangle
   - C equilateral triangle

6. Which of the following statements is always true?
   - A A right triangle is a scalene triangle.
   - B An equilateral triangle is an isosceles triangle.
   - C An isosceles triangle is an obtuse triangle.

7. Which of the following is not true of all right triangles?
   - A The sum of the measures of the angles is 180°.
   - B Two of its angles are supplementary angles.
   - C At least two of its angles are acute.

Name _____ Date _____ Class _____

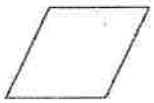
LESSON 8-6

Practice

Quadrilaterals

Choose the correct answer. The first one is done for you.

1. Which name best describes the figure shown below?



A quadrilateral
B parallelogram
C rhombus

2. Which name best describes the figure shown below?

A parallelogram
B square
C rectangle

3. Which of the following statements is not always true?
   A A quadrilateral has 4 sides.
   B A quadrilateral has 4 angles.
   C A quadrilateral has right angles.

4. Which of the following statements is always true?
   A A trapezoid is also a parallelogram.
   B A square is also a rhombus.
   C A parallelogram is also a rectangle.

5. Carol says this poster is a parallelogram. Anita says it is a rectangle. Explain why both of them are right.

_____

_____

_____

Name _____ Date _____ Class _____

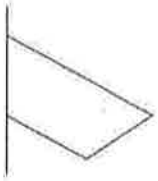
LESSON 8-6

Problem Solving

Quadrilaterals

Write the correct answer.

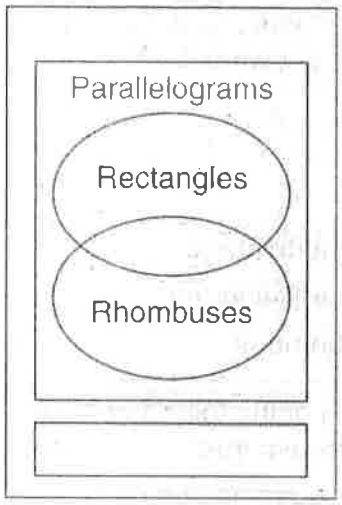
1. Part of this quadrilateral is hidden. What two shapes could the quadrilateral possibly be?



Experiment by completing the quadrilateral.

This shape could be a trapezoid or a parallelogram.

2. Complete the Venn diagram using the terms quadrilaterals, squares, and trapezoids.



3. How could you make a trapezoid from a rectangle using only one cut?

_____

_____

4. The base of a building is in the shape of a parallelogram. The four corners of the base are right angles. The four sides are congruent. What one word exactly describes the base?

_____

_____

Circle the letter of the correct answer.

5. A picture frame is in the shape of a quadrilateral. Each side has the same length. Which of the following is not a possible shape for the frame?

   A a rhombus

   B a square

   C a trapezoid

6. The total length of the four sides of the picture frame from Exercise 5 is 4 feet, 8 inches. What is the length of each of its sides?

   A 14 inches

   B 1 foot, 3 inches

   C 12 inches

Name _____ Date _____ Class _____

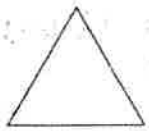
LESSON 8-7

Practice

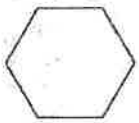
Polygons

Use the list to name each polygon.
The first one is done for you.

Terms
hexagon
octagon
pentagram
quadrilateral
triangle

1. 

triangle

2. 

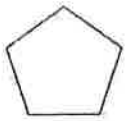
_____

3. 

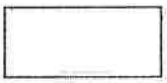
_____

4. 

_____

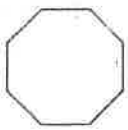
5. 

_____

6. 

_____

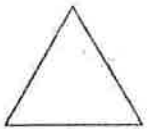
Tell whether each polygon appears to be *regular* or *not regular*.

7. 

_____

8. 

_____

9. 

_____

10. One side of a regular pentagon measures 4 inches. What is the total length of the sides of that pentagon?

_____

11. The total length of the sides of a regular octagon is 24 inches. What is the length of each side?

_____

Name _____ Date _____ Class _____

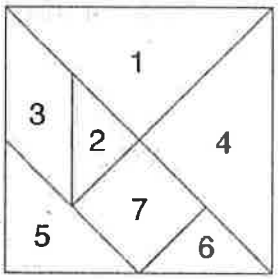
LESSON 8-7

Problem Solving

Polygons

Write the correct answer.

1. Finish naming the polygons in this figure.



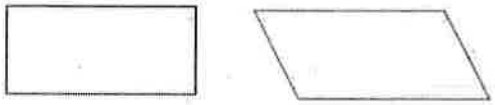
1, 2, 4, 5, and 6 are triangles.

_____

_____

_____

2. Draw the diagonals for the rectangle and parallelogram below. What new polygons are formed by the diagonals in each quadrilateral?



_____

3. In Exercise 2, what is true of the diagonals in the rectangle that isn't true of the diagonals of the parallelogram?

_____

_____

Circle the letter of the correct answer.

4. The perimeter of a regular hexagon is $13\frac{1}{2}$ inches. What is the length of each side?

   A $2\frac{7}{10}$ inches

   B $2\frac{1}{4}$ inches

   C $3\frac{3}{4}$ inches

5. Which of the following statements is sometimes false?

   A A plane figure is a polygon.

   B Each side of a polygon intersects exactly two other sides.

   C A polygon is a closed figure.