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THE ALPHABET OF MATHEMATICS

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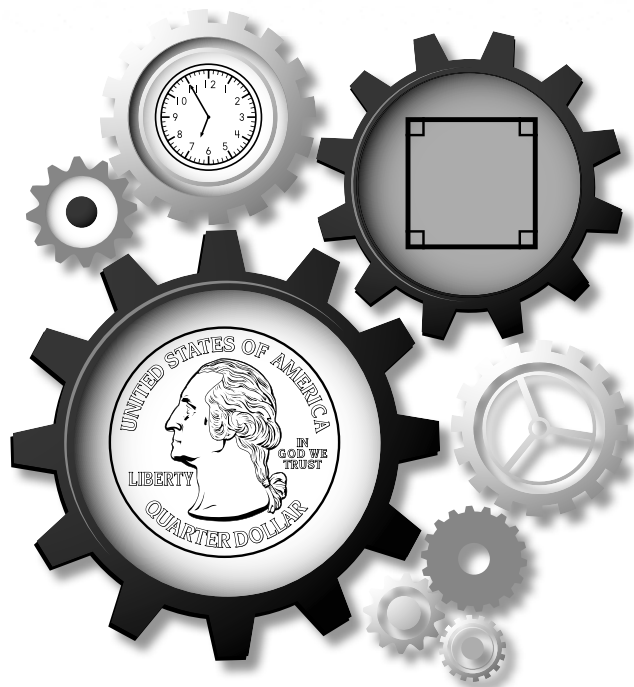


UNIT
9

CLASSIC UPPER GRADES GEOMETRY, MEASUREMENT, & DATA

MODULE TITLES

- 1: 2-D Shapes
- 2: Lines and Angles
- 3: Classification of 2-D Figures
- 4: Perimeter, Area, and Volume
- 5: Time, Money, and Distance
- 6: Units of Measure
- 7: Data Representation
- 8: Data Analysis



► Geometry, Measurement, and Data

Unit 9 ◉

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► Geometry, Measurement, and Data

Unit 9 ○

Introduction

Organization

The following paragraphs describe the structure of the curriculum. If you would like more information about TouchMath, our teacher training DVD is available at no charge. Request online at www.touchmath.com/freetraining, or call 1-800-888-9191.

Unit Components

The goals for each unit are defined in the overview of skills. These broad proficiencies often establish the framework for concepts of increasing complexity. The goals are broken down into clear, manageable objectives that list the academic expectations of the students and summarize the module-level objectives. Unit vocabulary and detailed Common Core State Standards complete the unit overview. The unit pre- and post-tests immediately follow with directions for administering, recording results, and using the results to determine each student's educational plan.

Module Guides

The table of contents provides the skeleton of the activities within each module guide. The modules include clusters—subsets of the featured skill. A paragraph overview of the module

- identifies the clusters,
- explains the activities,
- lists the Common Core State Standards by their code,
- specifies objectives in the order of presentation,
- labels basic prerequisites,
- lists vocabulary necessary for skill attainment, and
- suggests readily available materials that would be helpful during the lesson

The lessons in the modules begin with a pretest, which gives basic directions for completion. It is recommended that you give little instruction related to the skill before testing. A record sheet is included for tracking student achievement. This record is found on the third page of each module guide. Instructional strategies follow the pretest, providing ideas for the most effective use of the student activity sheets. Four different formatting conventions reveal which type of strategy is being offered:

Box: Information in this shape is background information for the teacher, explaining the skill and illuminating the purpose and/or value of mastery.

☞: A speech bubble offers what the teacher is to say to the class. Anyone presenting the lesson could use this script.

◆: A diamond bullet suggests action for the teacher. It typically includes directions such as "Write ... on the whiteboard." "Monitor students as they complete the row of problems."

Bold: Directions in bold type suggest actions relating to transitions. These include statements such as "Distribute activity sheets ... to the students." "Activity Sheet ... Directions." "Repeat the activity sheet xx process ..."

The answer keys are imbedded in the instructional strategies for a quick reference while planning or presenting the lesson. Modified directions for the activity sheets are included for use after the detailed, step-by-step process to ensure understanding of the concepts.

A posttest follows the instruction within the module. Refer to the module guide for directions for administering the posttest. You can record results and compare them to the pretest. The module concludes with suggestions for differentiated instruction and real world applications.

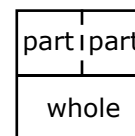
- When we supplement something, we add to it. You may have vitamin supplements. They are added to what you eat. To be **supplementary**, the **angles** must each be 90° , or one **angle** must be **acute** and the other **obtuse**. Draw a pair of **right angles** that are **supplementary**. Now draw a **straight angle**. Locate a point near the center of the **angle**. Draw an **acute angle** from the point. The other **angle** is an **obtuse angle**. We will talk more about **supplementary angles** when we learn about **obtuse angles**.¹

Write three important things you know now about **supplementary angles**. Your list could include that **supplementary angles** make 180° , **supplementary angles** with a common **vertex** make a straight **line**, **supplementary angles** can be two **right angles**, or they can be one **obtuse** and one **acute angle**.

Please think about **supplementary angles** and **right angles**. Two **right angles** are always **supplementary**. Are **supplementary angles** always **right angles**? No. This is the same thinking that you use when you think that all squares are rectangles but not all rectangles are squares. When you train yourself to think about related ideas, you improve your problem solving skills.

Basic Background

¹Finding supplementary angles is an additive process. Helping students see that two parts equaling a straight line can be related to the parts/whole concept.



Independent Practice

- Write the name of each **angle** on the line. Write four properties of **right angles**. Write what you know about **supplementary angles**. Write the number of **degrees** for the sum of the **right angles**.

Distribute activity sheet 44 to the students.

Instruction: activity sheet 44

- On activity sheet 44, make a box in each corner that is a **right angle**. Write the names of the **right angles**. At the bottom, list an example of **supplementary angles** in each shape. Use only **right angles** to determine **supplementary angles**.²

Independent Practice

- Follow the directions. At the bottom of the activity sheet, identify a pair of **right angles** that are **supplementary** in each shape.

Name _____ Date _____

Find the right angles in each shape. Write the names of the right angles.

1. L BAC

2. L ADC
L DCB
L CBA
L BAD

3. L ADC
L DCB
L CBA
L BAD

4. L ADC
L BAD

5. L ADC
L DCB
L CBA
L BAD

6. L EAB
L ABC

Write the names of one pair of supplementary angles in each shape above.

1. none
2. L ADC and L DCB
3. L CBA and L BAD

4. L ADC and L BAD
5. L DCB and L CBA
6. L EAB and L ABC

© 2015 TOUCHMATH UGU9M2 Right Angles

Instructional Insight

²The intent of the lesson is to focus on right angles. Recognizing that the sum of two right angles is a straight angle is the objective. An expanded definition of supplementary angles is included on activity sheet 47.

1. A point is a _____.

(A) location in space
 (B) •
 (C) both A and B
 (D) none of the above

2. A line is _____.

(A) made up of points
 (B) a 1-D object
 (C) 
 (D) all of the above

3. A parallelogram is a _____.

(A) 2-D shape
 (B) 3-D shape
 (C) 1-D shape
 (D) none of the above

4.  is _____.

(A) $\frac{1}{2} \times 3$ (B) $\frac{1}{2} \times \frac{1}{3}$
 (C) $2 \times \frac{1}{3}$ (D) none of the above

5. _____ have 2 endpoints.

(A) Rays
 (B) Line segments
 (C) Angles
 (D) None of the above

6. Circles are _____.

(A) 2-D shapes
 (B) polygons
 (C) 3-D shapes
 (D) none of the above

7. A triangle has _____ lines.

(A) parallel
 (B) intersecting
 (C) curved
 (D) none of the above

8. Perpendicular lines _____.

(A) intersect
 (B) are not parallel
 (C) form right angles
 (D) all of the above

17. Juan drives $8\frac{1}{2}$ miles to work. How far does he drive round trip?
- (A) 16 miles
 - (B) 17 miles
 - (C) 18 miles
 - (D) none of the above

18. How many minutes are in 4 hours?
- (A) 40 minutes
 - (B) 400 minutes
 - (C) 800 minutes
 - (D) none of the above

19. English class starts at 2:12 p.m. The class is 50 minutes. What time does it end?
- (A) 2:62 p.m.
 - (B) 2:58 p.m.
 - (C) 3:02 p.m.
 - (D) none of the above

20.  is _____.
- (A) 7:13
 - (B) 3:07
 - (C) 2:13
 - (D) none of the above

21. 36 inches = _____
- (A) 3 ft.
 - (B) 1 yd.
 - (C) both A and B
 - (D) none of the above

22. 2 quarts = _____
- (A) 36 oz.
 - (B) 32 oz.
 - (C) 24 oz.
 - (D) none of the above

23. 1 cm = _____
- (A) .01 m
 - (B) $\frac{1}{100}$ m
 - (C) 10 mm
 - (D) all of the above


24. 90 cm = _____
- (A) .9 m
 - (B) 9 m
 - (C) 9 mm
 - (D) none of the above

1.

A • is a _____.

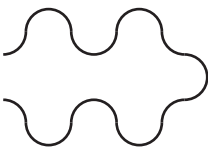
- (A) point
- (B) 2-D shape
- (C) line
- (D) none of the above

2.

A  is _____.

- (A) made up of points
- (B) a 1-D shape
- (C) a line
- (D) all of the above

3.

 is _____.

- (A) a closed shape
- (B) an open shape
- (C) both A and B
- (D) none of the above

4.

 is _____.


- (A) a trapezoid
- (B) a closed shape
- (C) one-half of a hexagon
- (D) all of the above

5.

, , and s are _____.

- (A) 3-D shapes
- (B) polygons
- (C) lines
- (D) none of the above

6.

A  is _____.

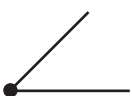
- (A) a polygon
- (B) made up of straight lines
- (C) a 2-D shape
- (D) all of the above

7.

 is _____.

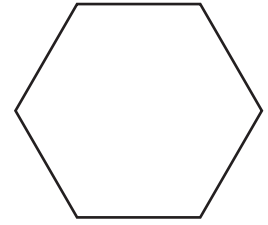
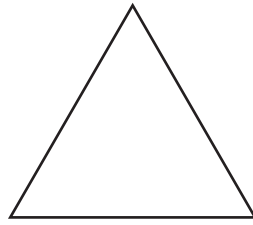
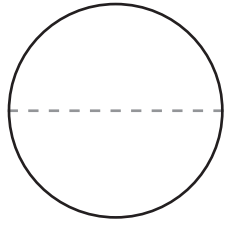
- (A) ray AB
- (B) angle AB
- (C) made of two lines
- (D) none of the above

8.

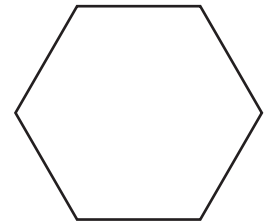
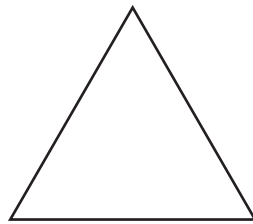
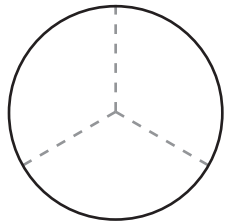
 is _____.

- (A) greater than
- (B) made up of two vertices
- (C) an angle
- (D) all of the above

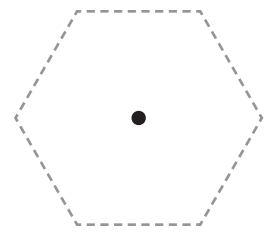
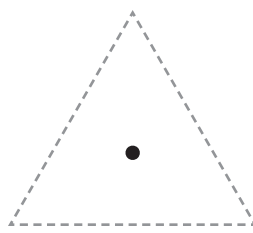
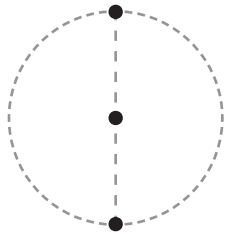
$\frac{1}{2}$



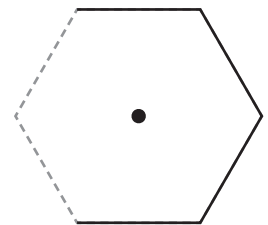
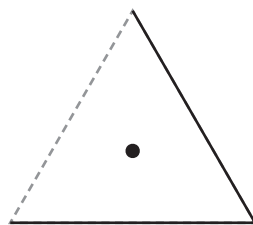
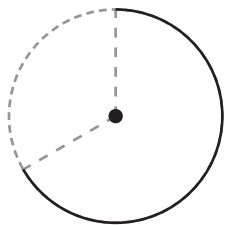
$\frac{1}{3}$



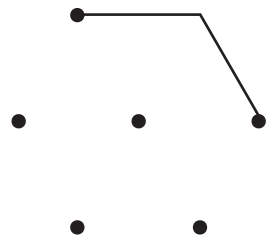
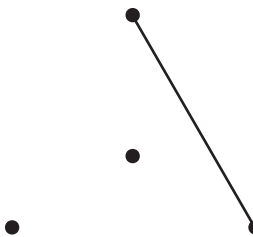
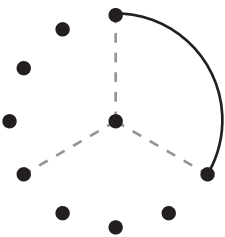
$\frac{1}{2}$



$\frac{1}{3}$

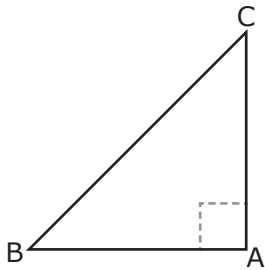


$\frac{2}{3}$



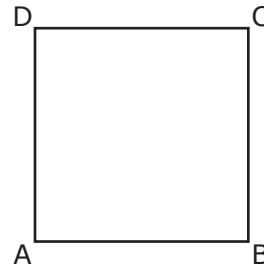
Find the right angles in each shape.
Write the names of the right angles.

1.

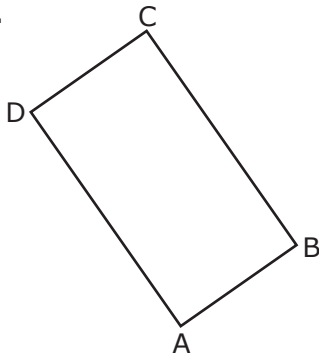


∠ BAC

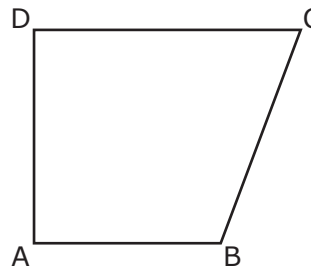
2.



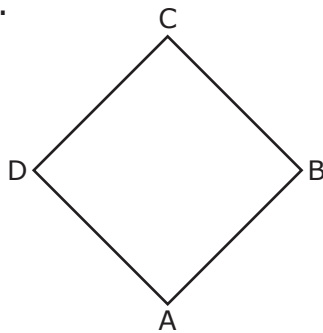
3.



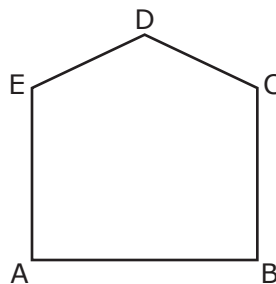
4.



5.



6.



Write the names of one pair of supplementary angles in each shape above.

1.

2.

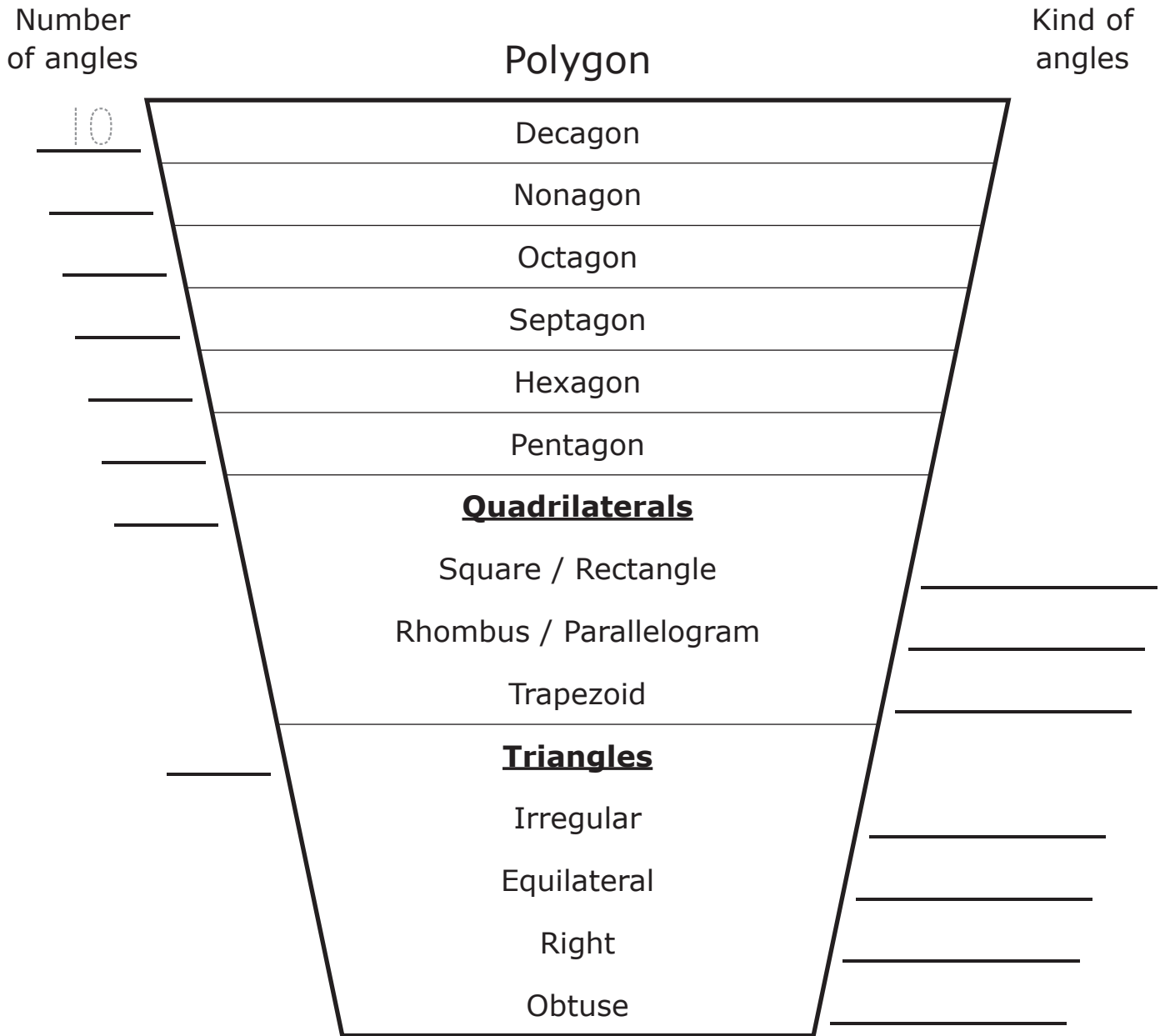
3.

4.

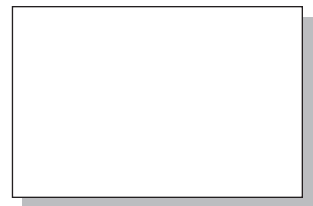
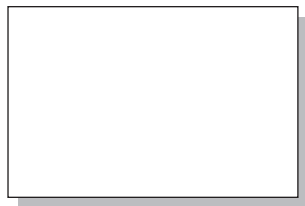
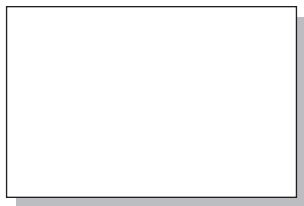
5.

6.

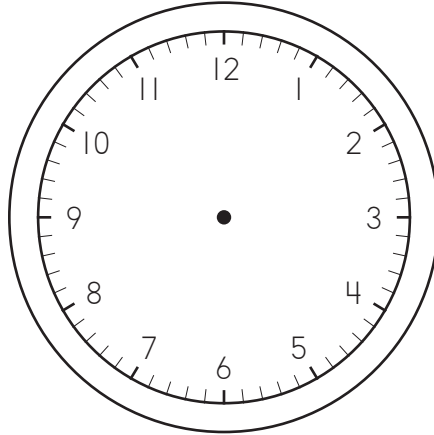
Hierarchy of Polygons (by Angles)



Angles:
made up
of lines



The day starts at:



The day ends at:



1. Mr. Johnson opens his store at 7:30 a.m. He closes at 5:45 p.m. for the night. He also closes for one hour for lunch. How much time is Mr. Johnson's store open each day? _____ hr. _____ min.

2. If the party starts at 1:15 p.m. and the last guest leaves at 4:30, how long does the party last? _____ hr. _____ min.

3. Judy roller skates from 9:07 a.m. until 10:17 a.m., then again from 1:33 p.m. until 3:59 p.m. How much time does Judy skate altogether? _____ hr. _____ min.

4. The Lawrence family drives from 8:13 a.m. until 4:17 p.m. on Monday. They drive from 7:47 a.m. until 5:41 p.m. on Tuesday. What is the difference in the amount of time they drive on the two days? _____ hr. _____ min.

5. If Andre leaves on his bike at 7:43 a.m. and rides for $5\frac{3}{4}$ hours, what time is it when he stops riding?

6. Chi practices the violin for 3 hours and 22 minutes four days each week. What is the total amount of time he practices in five weeks? _____ hr. _____ min.

How much would you earn if you worked:

A. 30 hours per week at \$7.00 per hour? _____

B. 30 hours per week at \$9.15 per hour? _____

C. 30 hours per week at \$11.44 per hour? _____

D. 30 hours per week at \$15.38 per hour? _____

E. 30 hours per week at \$20.79 per hour? _____

How much would you earn if you worked:

F. 40 hours per week at \$7.00 per hour? _____


G. 40 hours per week at \$9.15 per hour? _____

H. 40 hours per week at \$11.44 per hour? _____


I. 40 hours per week at \$15.38 per hour? _____

J. 40 hours per week at \$20.79 per hour? _____


1.

A  F


2.

G  A

3.

E  H


4.

F  B

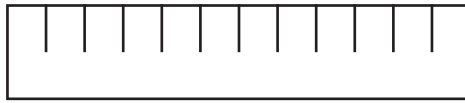
5.

C  G

6.

I  E

12 inches (in.) = 1 foot (ft.)



36 inches (in.) = 3 feet (ft.) = 1 yard (yd.)



- 16 in. = 1 ft. 4 in.
1. 20 in. = _____ ft. _____ in.
 2. 25 in. = _____ ft. _____ in.
 3. 30 in. = _____ ft. _____ in.
 4. 38 in. = _____ ft. _____ in.

- 1 ft. 2 in. = 14 in.
5. 1 ft. 9 in. = _____ in.
 6. 2 ft. = _____ in.
 7. 2 ft. 6 in. = _____ in.
 8. 3 ft. = _____ in.

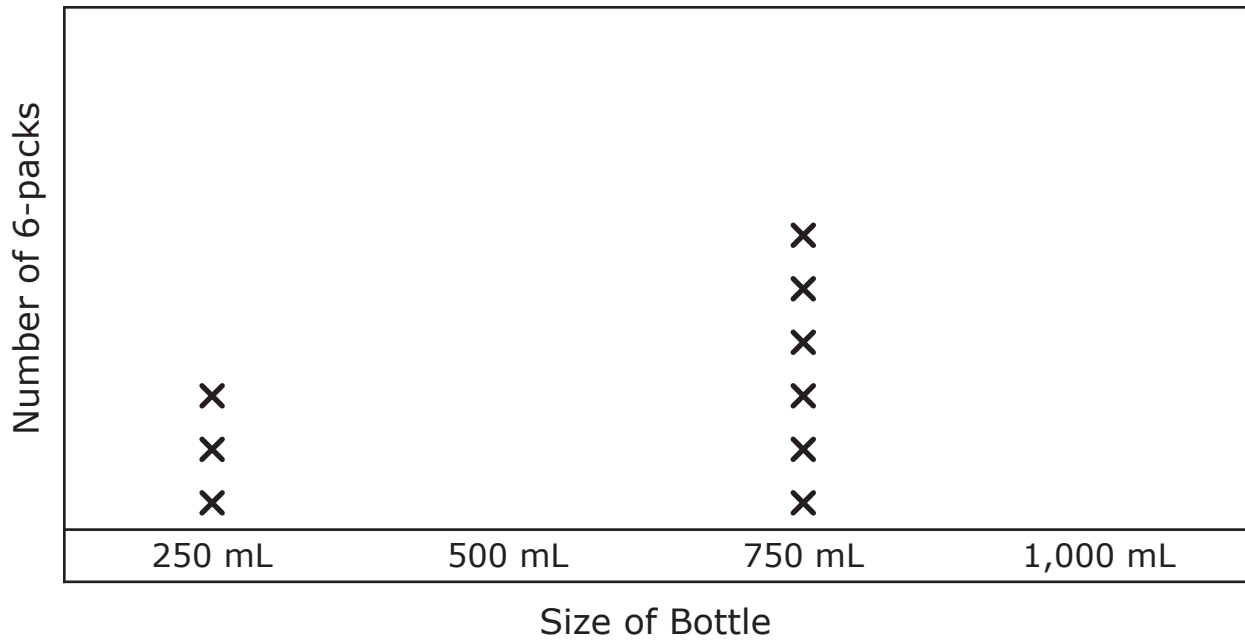
9. James has a board that is 3 ft. long. What is another name for 3 ft.?

- (A) 2 yd.
- (B) 1 yd.
- (C) 24 in.
- (D) 12 in.

10. How many inches are in 3 yd.?

- (A) 108 in.
- (B) 98 in.
- (C) 72 in.
- (D) 110 in.

6-Packs of Bottles of Water



Use the following information to complete the line plot.

The store had 24 1,000 mL bottles of water.	It had a total of 15,000 mL of water in 500 mL bottles.
---	---

How many 6-packs did the store have? _____

This was _____ individual bottles. _____

How much more water was in the 750 mL bottles altogether than in the 500 mL bottles altogether? _____

Did the store have more 6-packs of 500 mL bottles or 1,000 mL bottles? _____

Did the store have more water in the 500 mL bottles altogether or in the 1,000 mL bottles altogether? _____

How much more? _____