

Trigonometry Summer Math Packet
William M. Davies, Jr. Career & Technical High School
2010

Directions: Complete all ten problems below in the space provided. You must show all work neatly and in an organized fashion along with the correct answer to receive ten points. No scrap.

Problem #1 (N&O) 10-4: Accurately solves problems that involve dimensional relationships.

Imagine you have 1,000 dice. Each dice is a cube measuring 1.5 cm on a side.

- a) Suppose you lay out these 1,000 dice in a single row. What is the length of the row in centimeters?

- b) Suppose you lay out the largest possible square (one layer deep) using no more than 1,000 dice.
 - a. How many dice does that square use?

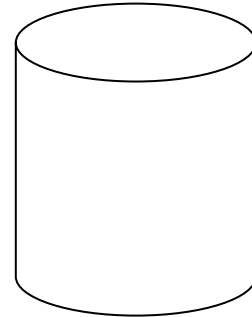
 - b. What is the length of a side of the square in centimeters?

- c) Suppose you construct the largest possible cube using no more than 1,000 dice.
 - a. How many dice does that cube use?

 - b. What is the length of a side of the cube in centimeters?

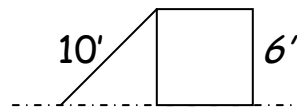
Problem #2 (G&M) 10-6b: Solves problems within mathematics or across disciplines or contexts involving circumference.

A square with a side length of 12.5 cm is rolled up, without overlap, to form the lateral surface of a cylinder. What is the radius of the cylinder to the nearest tenth of a centimeter? $C = 2\pi r$, $A = \pi r^2$



Problem #3 (G&M) 10-9d: Solves problems on and off the coordinate plane involving slope.

A 10-foot board is leaning against a platform with a height of 3 feet. If the same board is leaned against a platform with a height of 6 feet, is the slope exactly doubled, more than doubled, or less than doubled? Support your reasoning.



Problem #4 (G&M) AM-7a,b: Uses radian measure appropriately when solving problems and converting between radian measure and degree measure.

Find both the degree and radian measures of the angle through which the hour hand on a clock rotates from 5 A.M. to 10 A.M.

Problem #5 (N&O) 10-4b: Accurately solves problems that involve percents.
(G&M) 10-6e: Solves problems within mathematics or across disciplines or contexts involving volume.

The largest, or *Great Pyramid*, was built around 2600 B.C. The base covers about 13 acres and stands 480 feet tall.

$$V \text{ of a pyramid} = \frac{\text{Area of the Base} \cdot h}{3}$$

- a. What is the volume of the *Great Pyramid*? (Hint: 1 acre = 43,600 ft²)

- b. If the tip of the apex is missing and it has a base area of 9604 square feet and a height of 60 feet, what percent of the *Great Pyramid* would be missing?

Problem #6 (G&M) 10-2Sa,d: Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems within mathematics or across disciplines or contexts involving angles and polygons.

-Quadrilateral $QRST$ has diagonals \overline{QS} and \overline{RT} that intersect at point P .

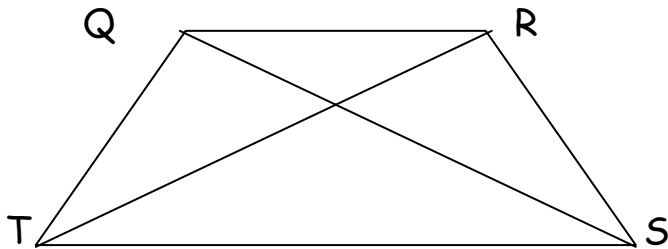
-Triangle QPT is congruent to triangle RPS ($\triangle QPT \cong \triangle RPS$).

- $\angle SPT = 114^\circ$ and $\angle RSQ = 20^\circ$

Place this information on the diagram below.

a. What is the measure of $\angle TQS$? Show your work.

b. What is the measure of $\angle QRT$? Show your work.



Problem #7 (G&M) 12-6a,b: Solves problems by applying trigonometric formulas involving angles and lengths.

The distance from Albany to Bethany is 75 miles and from Bethany to Celina 105 miles. If the roads from Bethany to Albany and from Albany to Celina make an 87° angle, what is the distance from Albany to Celina? Round to the nearest tenth.

Problem #8 (G&M) 10-2Se: Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems within mathematics or across disciplines or contexts involving right triangle ratios.

Find the perimeter of $\triangle ABC$ to the nearest tenth if $A = 25^\circ$, $C = 90^\circ$, and $c = 10$ meters.

Problem #10 (G&M) 10-2S d: Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems within mathematics or across disciplines or contexts involving polygons.

An artisan has been hired to repair a leaded glass window that looks like the picture below. The glass is held in the window by its wooden frame and by six diagonal lead strips. If the artisan must replace all six diagonal strips and the lead is sold in centimeters lengths only, what is the total length of lead (to the nearest centimeter) that she must provide?

