

PURCHASE OF A CORNER CABINET FOR A BUSINESS OFFICE

Performance Standard (7A/7C/9B/9D).I

Determine appropriate measurements for a corner computer cabinet:

- *Mathematical knowledge:* recognize special triangles, similarity and congruence; know how to measure and solve problems involving scale drawings and special triangles.
- *Strategic knowledge:* determine the dimensions of a cabinet to be purchased to house a computer screen of given dimensions within error tolerances; use the properties of 45° - 45° - 90° triangles.
- *Explanation:* explain completely and clearly what was done and why it was done; write a description of the design steps that is detailed and clear enough to be replicated by another person.

Procedures

1. *In order to measure and compare quantities using appropriate units, instruments and methods (7A); select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings (7C); identify, describe, classify and compare relationships using points, lines, planes and solids (9B); and use trigonometric ratios and circular functions to solve problems (9D),* students should experience sufficient learning opportunities to develop the following:
 - Calculate by an appropriate method, the length, width, height, perimeter, area, volume, surface area, angle measures or sums of angle measures of common geometric figures, or combinations of common geometric figures.
 - Solve problems involving scale drawings, models, maps or blueprints.
 - Solve problems using indirect measurement by choosing appropriate technology, instruments and/or formulas.
 - Solve problems in and gain insights into other disciplines and other areas of interest such as art and architecture using geometric ideas.
 - Solve problems using triangle congruence and similarity of figures.
 - Solve problems using 45° - 45° - 90° and 30° - 60° - 90° triangles.

Employees must be able to recognize shapes and employ the various formulas associated with each shape to solve day-to-day problems and situations. Triangular, as well as other geometric shapes, are often encountered in the work world. This assessment aligns to Workplace Skill H7 (Solving Problems and Critical Thinking/Select and implement a solution to a problem.)

2. Provide each student a copy of the "Corner Cabinet for a Business Office" task sheet and the rubric. Have students review and discuss the task to be completed and how the rubric will be used to evaluate it.
3. Have students complete the following task within a classroom setting:

Mr. Smith wants to purchase a corner cabinet for the computer system in his business office. The new cabinet must be the same length on each side and large enough to hold the computer system that is 27 inches wide and 24 inches deep. What is the minimum length for each side of the cabinet if it is to hold the system? Express the answer in a form that would be used for measuring at an office furniture store; that is, one that could be located on a measuring tape or ruler. Show all of your work, and explain in words what you did and why you did each step.
4. Evaluate each student's work using all three dimensions of the rubric and its guide to determine the performance level. Error tolerance should be appropriate to the situation (i.e., what is possible precision for office furniture) for a score of 4 in mathematical knowledge. The student should utilize the properties of 45° - 45° - 90° triangles for a score of 4 in strategy. The written description should match the method used and be detailed enough to be replicated by another person reading the description for a score of 4 in explanation. An answer containing a square root should not score above a 3 in mathematical knowledge.

Examples of Student Work

- [Meets](#)
- [Exceeds](#)

Time Requirements

- Two class periods

Resources

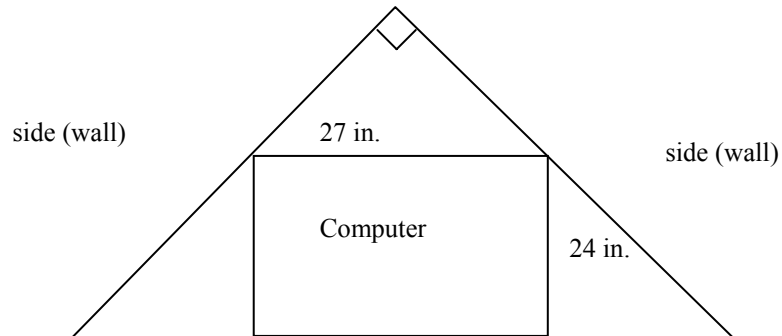
- Copies of the "Corner Cabinet for a Business Office" task sheet
- Calculator with trigonometric functions
- Mathematics Rubric

NAME _____ DATE _____

CORNER CABINET FOR A BUSINESS OFFICE

Student Task Sheet

Mr. Smith wants to purchase a corner cabinet for the computer system in his business office. The new cabinet must be the same length on each side and large enough to hold the computer system that is 27 inches wide and 24 inches deep. Below is an overhead view.



What is the minimum length for each side of the cabinet if it is to hold the computer system? Express the answer in a form would be used for measuring at an office furniture store. Show all of your work, and explain in words what you did and why you did each step.

Adapted from Exemplars, Math 9-12 Sample, "Entertainment Center," www.exemplars.com/math_sample_9-12.html, 2000.

MATHEMATICS RUBRIC

NAME _____ DATE _____

- Exceeds standard (must receive a 4 in each area)
- Meets standard (must receive all 3's or a combination of 3's and 4's)
- Approaches standard (must receive all 2's or any combination which may include a 3 or a 4)
- Begins standard (has no 3's or 4's but not all 1's)
- Absent (has all 1's and 0's)

	Mathematical Knowledge	Strategic Knowledge	Explanation
4	<ul style="list-style-type: none"> • Wrote the right answer. • Used math words correctly to show understanding of how math works. • Worked it out with no mistakes. • Used the right math words and labeled the answers. 	<ul style="list-style-type: none"> • Identified all the important parts of the problem, and knew how they went together. • Showed all the steps used to solve the problem. 	<ul style="list-style-type: none"> • Wrote what was done and why it was done. • If a drawing was used, all of it was explained in writing.
3	<ul style="list-style-type: none"> • Knew how to do the problem, but made small mistakes. 	<ul style="list-style-type: none"> • Identified most of the important parts of the problem. • Showed most of the steps used to solve the problem. 	<ul style="list-style-type: none"> • Wrote mostly about what was done. • Wrote a little about why it was done. • If a drawing was used most of it was explained in writing.
2	<ul style="list-style-type: none"> • Understood a little, but made a lot of big mistakes. 	<ul style="list-style-type: none"> • Identified some of the important parts of the problem. • Showed some of the steps used to solve the problem. 	<ul style="list-style-type: none"> • Wrote some about what was done or why it was done but not both. • If a drawing was used, some of it was explained in writing.
1	<ul style="list-style-type: none"> • Tried to do the problem, but didn't understand it. 	<ul style="list-style-type: none"> • Identified almost no important parts of the problem. • Showed almost none of the steps used to solve the problem. 	<ul style="list-style-type: none"> • Wrote or drew something that didn't go with the answer. • Wrote an answer that was not clear.
0	<ul style="list-style-type: none"> • No answer attempted. 	<ul style="list-style-type: none"> • No strategy shown. 	<ul style="list-style-type: none"> • No written explanation.
Score			