Bedroom Design Student Packet

Class and Period [   ] **Date:** [   ]

List students in Group: (Put your name in top left)

Materials and Tools you will need:

Google Sketch Up, Microsoft Excel or equivalent, Internet access (optional)

Enough mat board to build walls and floor
(1) 3/16" x 3/16" x 36" balsa for furniture
(1) 3/16" x 1/8" x 36" balsa for furniture
(1) 1/16" x 3" x 36" balsa for furniture
(1) 8" x 10" mirrored paper for windows
Assorted special papers for interior design
Choice of felt, wood textured foam, or marble textured foam for flooring
Assorted Tools provided by instructor

State what the design challenge is:

I. Clarify the Design Specifications and Constraints

What are the specifications and constraints the design must meet?

II. Research and Investigate

In order to better complete the design challenge, you need to first gather information to help you build a knowledge base. Completing the **Knowledge and Skill Builders** that follow will enhance your ability to design a cost-effective and functional bedroom. **Complete Knowledge and Skill Builders 1 – 7.**
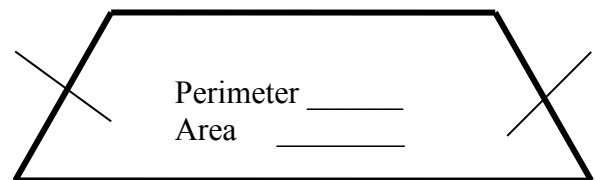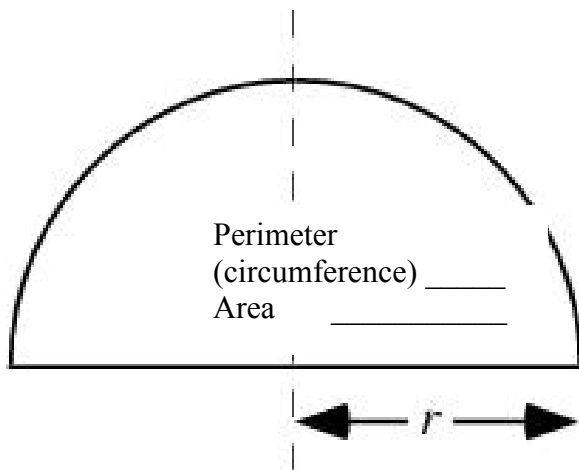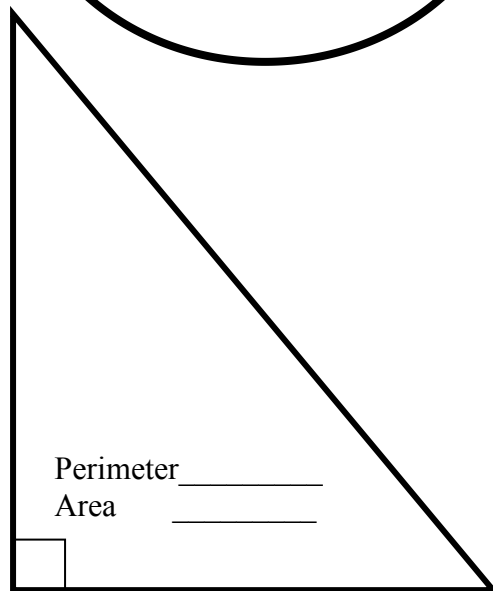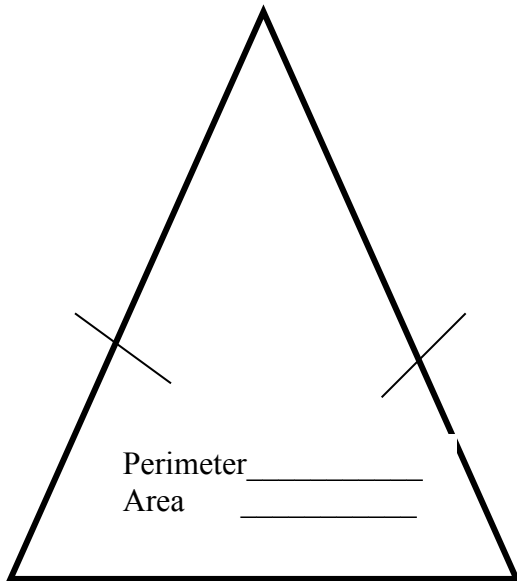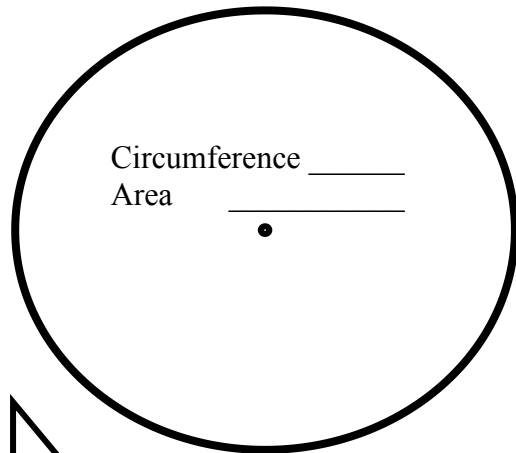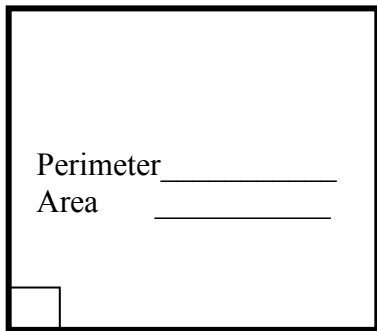
Knowledge and Skill Builder 1: Geometric Shapes

Measure the dimensions of the following shapes (in inches), and determine their perimeters (in inches) and their areas (in square inches). Round the dimensions to the nearest half-inch.
Area Formulas [Rectangle **A=lw**, Triangle **A= ½bh**, Circle **A=π r^2**, Trapezoid **A= ½ (b1+b2)h**]
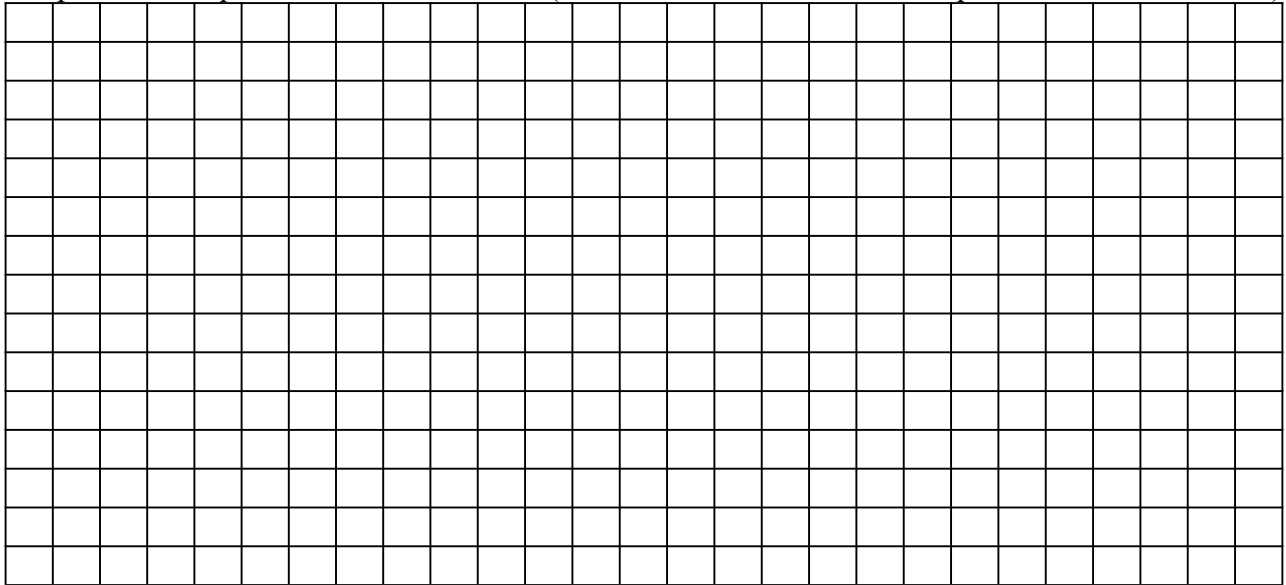Perimeter of Polygons: **Sum of measures of all sides;** Circumference of Circle: **C=πd**
Note: You must show all work for each shape.

Perimeter_____
Area   _____

Circumference _____
Area   _____

Perimeter_____
Area   _____

Perimeter_____
Area   _____

Perimeter
(circumference) _____
Area   _____

Perimeter _____
Area   _____

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2

Knowledge and Skill Builder 2: Factoring

Using the given square tiles, arrange as many rectangles as possible that have different dimensions and then draw them on the grid below. Complete the table that follows the grid and respond to the questions about the table. (Show all of the whole number possibilities in the table.)

Length in units	Width in units	Area in square units	Perimeter in units

1. How do you know you have found all rectangles meeting the requirements provided?

2. What is the relationship between the dimensions of a rectangle and its area?

3. What is the relationship between the dimensions of a rectangle and its perimeter?

4. Describe the rectangle with an area of 24 square units and the greatest perimeter.

5. Describe the rectangle with an area of 24 square units and the least perimeter.

6. How can the costs of wall construction and wall covering be minimized?

Knowledge and Skill Builder 3: Percentage

Guidelines recommend that windows represent at least 20% of the square footage of a room. How might you find 20% of 180 square feet?

_____

What is 20% of 180 square feet? _____

Class or Group Work

1a. Assume that a room you are designing has dimensions of 12 feet by 15 feet. What is the floor area? _____
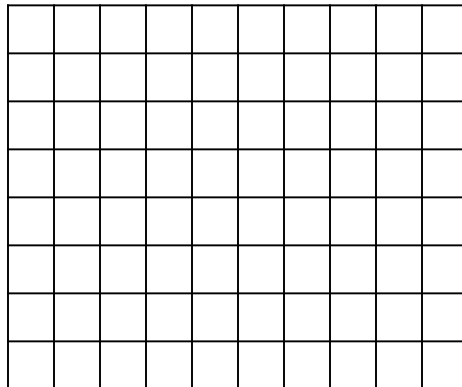
1b. Assume you are designing a trapezoidal room with a height of 12 feet and bases of 10 feet and 20 feet. What is the floor area? _____

1c. Assume you are designing a semicircular room with a diameter of 21.4 feet. What is the floor area? _____

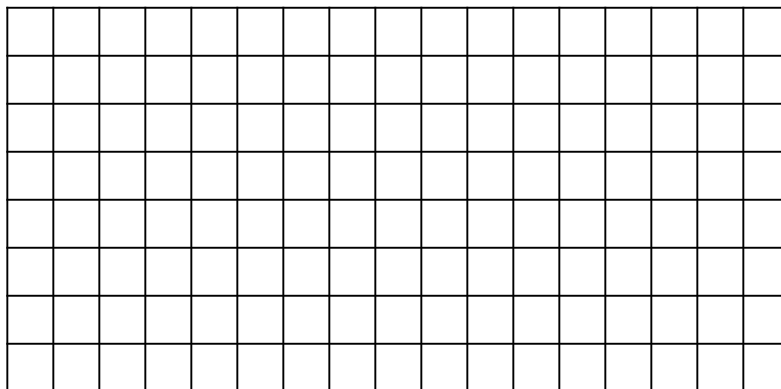Select one of the above shapes for your room, and use the 20% of floor area rule for these problems:

What could be the dimensions of a square window? _____
Sketch a possible square window on the grid below, using a scale of ¼" = 1 foot.

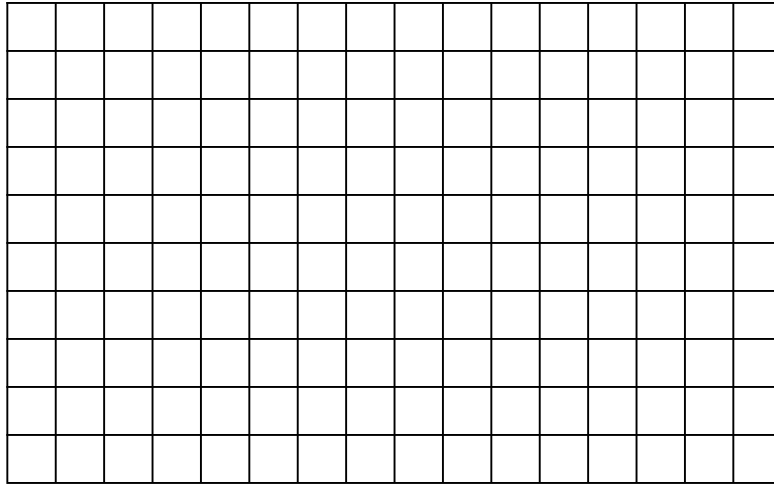What could be the logical dimensions of a nonsquare rectangular window? _____
Sketch a possible rectangular window on the grid below, using a scale of ¼" = 1 foot.

Pick one of the following two problems and complete:
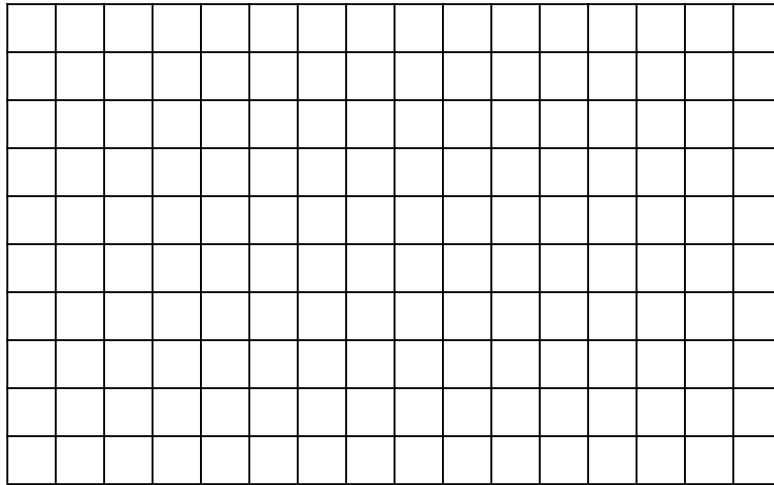
What could be the logical dimensions of a triangular window? _____

Sketch a possible triangular window on the grid below, using a scale of ¼" = 1 foot.

What could be the logical dimensions of a trapezoidal window? _____

Sketch a possible trapezoidal window on the grid below, using a scale of ¼" = 1 foot.

Knowledge and Skill Builder 4: Mathematics of Scale

Scale models help in visualizing what the finished room will look like. Instead of making a full-size drawing, we can use a scale in which 1 inch equals 1 foot. If the full-size dimension is 12 feet, the scaled dimension—the line we draw to represent 12 feet—is 12 inches long.

Making a Scale Drawing
A scale drawing of a room that measures 12 feet by 15 feet is to be created. Which of the following scales would require paper with the largest dimensions?
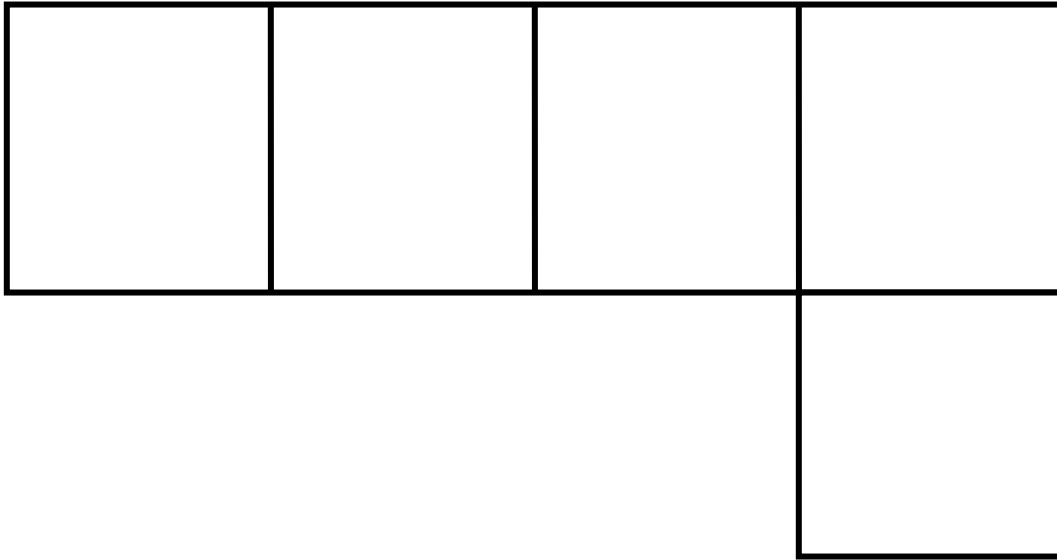
a) ½ inch = 1 foot; b) 1 inch = 1 foot; c) 2 inches = 1 foot

On separate sheets of paper, make three scale drawings of a room that measures 12 feet by 15 feet using the scales above.
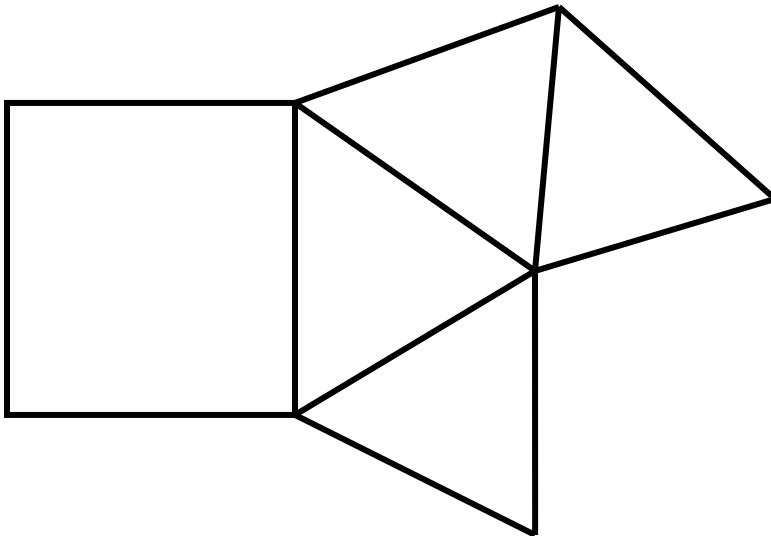
Which scale drawing can provide the most detail? Why? If you were forced to represent the drawing on letter-size paper (8.5" x 11"), which would you choose? Why?

_____
_____
_____

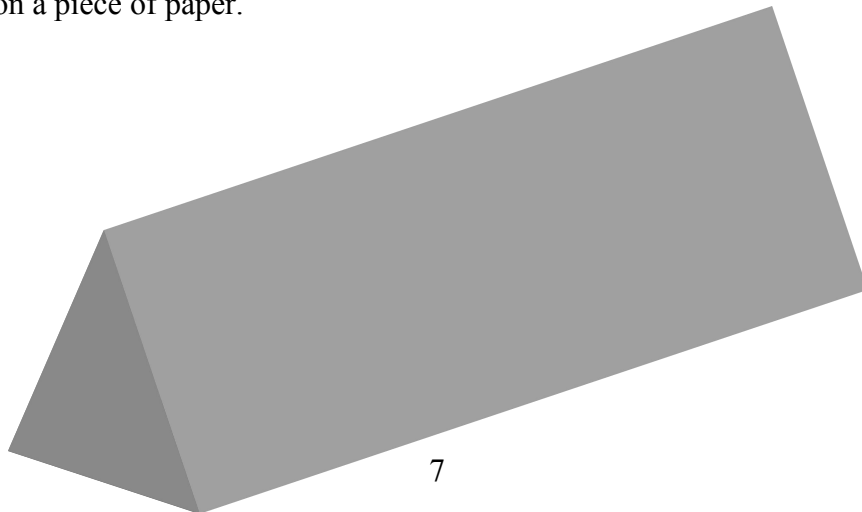## Knowledge and Skill Builder 5: Mathematical Nets

a) Draw the following net on a piece of paper and fold it, taping the edges. What shape is it?

b) Draw the following net on a piece of paper and fold it, taping the edges. What two-dimensional geometric shapes form this net and what is the formed shape? _____

c) What is the solid figure below called? _____ Draw the following net on a piece of paper.

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Knowledge and Skill Builder 6. Aesthetics

What is the atmosphere you would like to create in your bedroom? Will it be vibrant and alive? Quiet and cozy? The shape and design of your furnishings and the location of windows and skylights can have a great effect. Describe the atmosphere you want. Indicate your preferences for the shape and design of furnishings and the placement of windows.

Choose a color scheme. You can use pleasing color combinations wherever you like.

What color(s) should your room be?
What color should the floor be?
What color(s) should the furnishings be?

Knowledge and Skill Builder 7. Spreadsheets and Pricing Information

An Excel worksheet can be used for prices in designing your bedroom. However, they may not represent the best prices available. Investigate costs in catalogs, online, or newspaper advertisements and change prices to make your worksheet more accurately reflect real costs.

(Refer to Excel Spreadsheet provided as a separate file)

III. Generate Alternative Designs

Insert each individual's solution to the bedroom design problem. Remember to consider the specifications and constraints. Include a description of what you consider to be each solution's strengths and weaknesses. Use additional sheets of paper if necessary.

IV. Choose and Justify the Optimal Solution

Optimize your solution by choosing elements and ideas from each of the individual drawings. What makes this drawing better?

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What tradeoffs (choosing one thing in place of another) if any, did you make in selecting this alternative?

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V. Test and Evaluate
Did your design meet the initial specifications and constraints? How do you know?

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Besides the initial specifications that you were given, did you or your instructor add any additional specifications?

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VI. Redesign the Solution

What problems did you encounter that would influence a redesign of your solution? Did you change your original design concept? Why?

If you had to redesign your model, what changes would you recommend in your new design? Explain your reasoning.

VII. Communicate Your Achievements

Describe the plan you will use to present your solution to your class, and show what handouts you will use. (You may include Power Point slides).