Program Information			
	[Lesson Title] ***Perimeter and Area of Squares and Rectangles***	**TEACHER NAME** **Carolyn Connelly**	**PROGRAM NAME** **Trumbull Career & Technical Center**
	[Unit Title]	**NRS EFL(s)** **2 – 3**	**TIME FRAME** **60 minutes**

Instruction

ABE/ASE Standards – Mathematics

Numbers (N)		Algebra (A)		Geometry (G)		Data (D)	
Numbers and Operation		Operations and Algebraic Thinking		Geometric Shapes and Figures		Measurement and Data	D.3.3 D.2.13
The Number System		Expressions and Equations	A.4.3	Congruence		Statistics and Probability	
Ratios and Proportional Relationships		Functions		Similarity, Right Triangles. And Trigonometry		**Benchmarks identified in *RED* are priority be benchmarks. To view a complete list of priority benchmarks and related Ohio ABLE lesson plans, please see the Curriculum Alignments located on the Teacher Resource Center (TRC).**	
Number and Quantity				Geometric Measurement and Dimensions			
				Modeling with Geometry			

Mathematical Practices (MP)

✓	Make sense of problems and persevere in solving them. (MP.1)	☐	Use appropriate tools strategically. (MP.5)

	☐	Reason abstractly and quantitatively. (MP.2)	☐	Attend to precision. (MP.6)
	☐	Construct viable arguments and critique the reasoning of others. (MP.3)	☐	Look for and make use of structure. (MP.7)
	☐	Model with mathematics. (MP.4)	☐	Look for and express regularity in repeated reasoning. (MP.8)

LEARNER OUTCOME(S)

- The student will be able to compute perimeter of squares and rectangles by use of addition and multiplication.
- The student will be able to compute area (square unit) of squares and rectangles by use of addition and multiplication

ASSESSMENT TOOLS/METHODS

- Teacher observation of student answers.
- Student completion of area and perimeter worksheets.
- Student creation of area and perimeter word problems.
- Exit Ticket.

LEARNER PRIOR KNOWLEDGE

- Go over properties of a rectangle and a square—four sides, four right angles--opposing sides are the same length.

INSTRUCTIONAL ACTIVITIES

Opening for these activities allows for the instructor to assess the prior knowledge of the students. Keep the questions open ended. There are no right or wrong answers.

1. The instructor will ask the following questions:
    a. Who, in this class, does home repair? (if none, volunteer that you have done some in the past)
    b. What type of repair do you attempt?
        i. Accept appropriate answers relating to background knowledge of the students, i.e. painting, landscaping, tile work, dry walling, etc.
    c. How do you know how much to buy to complete a project? For

RESOURCES

Index cards

Chalk/white board

Projector, ability to project

Computer

Internet access

Math Rocks! Perimeter and Area. (n.d.). Retrieved

	example, if you were to purchase floor covering, how do you know how much you will need to complete the job? How much will it cost you? What is the better bargain? d. Do you figure out how much of the product you need or do you let the "professionals" do it? Why or why not? i. Students may state they have no idea how to compute their needs, they may also say it is easier to let the person at the store do it for them, they may say it never occurred to them that a plan of action would be necessary, they may say they already know how to do the task at hand. 2. Task 1: a. Let's say you are thinking of putting up a fence around the entire edge of your property. How do you know how much fencing you will need to purchase? What questions should you ask yourself prior to going to the home improvement center and purchasing the fencing? i. Possible questions students may say could be: What are the dimensions of the yard, how much money you have to spend, what part of the yard is not fenced in? b. If the yard in total is 40 feet by 100 feet, how do you know how many linear feet of fencing would you need? c. What could you do to help you figure out what you will need for the job? i. Possible answers: draw a picture, ask for help. d. How would you draw the picture of that to depict the yard? i. Possible answers: draw a picture that shows a rectangle; label the sides 40 feet, 100 feet, 40 feet, and 100 feet. Make a picture that has 40 squares on one side, 100 squares on the other side, 40 squares on the third side, and 100 squares on the fourth side. e. What would you do with this information, then?	from https://www.youtube.com/watch?v=wwpsZuVLSIM Student copies of *Determining Area with Square Units* worksheet (attached) Student copies of *Determining Perimeter* worksheet (attached) Student copies of *Finding Area* worksheet 9attached) Student copies of *Finding Perimeter and Area Word Problems* (attached)

	i. Possible answers: add up each side 40 + 100 + 40 + 100 = 280 feet. The two opposite sides of a rectangle are the same, so multiply the length by 2 and the width by 2 and then add them together as in 2 x 100 plus 2 x 40 which would equal 280 feet. f. What would lead you to do this problem this way? i. Possible answers: If the fence goes around the property, then I know I have to measure the entire edge of the property. It would be the perimeter, and perimeter means outer edge. g. That is right. What you are saying is that the perimeter is the outer edge of a square or rectangle. What could we use as a "rule" for finding the perimeter of this shape? i. Possible answers: Add up all of the sides and that is what the perimeter is. There are two sets of equal sides so multiply the length times 2 and the width times 2 and add them together. h. Instructor: Great rule. Let's put that on a note card for future reference. i. Ask students to summarize the rule and record it on the chalk board for them to copy on the note card for future use. 3. Task 2: a. Now let's say we are going to build a picture frame for a new poster we bought at the store. What would you have to know prior to going to purchase the material? i. Possible answer: how big is the poster? b. The poster is 2 feet by 3 feet. How will I be able to know how much material I need to purchase to frame the poster? i. Possible answer: I could draw a rectangle that has a side that is 2 feet, one side that is 3 feet, a third side that is 2 feet, and the fourth side is also 3 feet. Then I can count the measurement of the sides.	

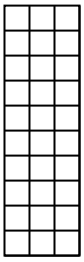
	4. Task 3: a. Finally, we are going to tile a bedroom floor. The 1 foot by 1 foot tiles that I like are on sale at Lowe's for $.69 each. The dimensions of the bedroom are 16 feet by 16 feet, with a closet that is attached to the one wall that is 2 feet by 3 feet. How many tiles must I purchase to complete the job of tiling? b. Do you have all the information you need to figure this out? What is your plan of attack here? Remember, I don't want to know the perimeter of the room; I want to know how many tiles I will need to completely cover the floor and the closet. i. Possible answers: Draw a picture of the bedroom floor that is 16 feet long and 16 feet wide and add a closet that is 2 feet long and 3 feet wide. c. What is your next step? i. Possible answer: Count the squares that are inside of the drawing. d. Great, so what you are saying is to find out how many tiles you need, you will count the squares and that will tell you how many tiles are to be purchased. What math operation is that? Not perimeter, but … any guesses on what it is called when you find the amount of square units within something? i. Possible answer: Area. e. Great. Another great rule. Ask students to summarize the rule and record it on the chalk board for them to copy on the note card for future use. f. To find the area of a square or rectangle, count up all of the squares within the outline of the rectangle or square. How many squares are in the 16 ft by 16 ft room along with the 2 ft x 3 ft closet? i. Answer: 256 plus 6 = 262 square feet. g. Any other way of doing this that would take less time? i. Possible answer: Since I know that area is length times the width, I just counted down 16 rows and over	

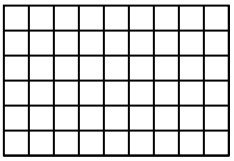
	16 rows and multiplied those two numbers together and then I multiplied 2 x 6 and then added the two answers together and got 262 square feet. h. That's right. An easier way to find the area of a rectangle or a square is by multiplying the length times the width. And in this case there is an added on closet that needs to be included. So let's add this to the rule on the note card: Area = the length times the width. Let's let A stand for area, "l" stand for length, and "w" stand for width. So the math sentence would read: A= l x w or Area equals the length times the width. 5. Have students watch Math Rocks! Perimeter and Area and ask student to add relevant information to their notecards. 6. Instructor: Ask students to assemble into groups of 3 and create a word problem using either perimeter or area of a rectangle or a square. Once all groups have created their word problems have a representative from each group write their group's word problem on the board, instruct the students to solve the problem on their own, and ask for a volunteer to offer the solution. 7. Give each student copies of the 4 worksheets and ask students to complete the worksheets for practice. Walk around the room and assist students who need help. When students finish have them turn in the worksheets. 8. Exit Ticket: a. Without looking at your cards, write on an index card the rules for perimeter and area of a square or rectangle.	

	DIFFERENTIATION • Use of calculator, scrap paper, small group, pairing lower functioning with higher functioning, using visuals, creating note cards
Reflection	**TEACHER REFLECTION/LESSON EVALUATION** This is a real life lesson that allows a person to gain the knowledge to become more confident when tackling home repairs, etc. Practicality is important to me. It gives the students an opportunity to almost role play the part of being a consumer at a home improvement store.
	ADDITIONAL INFORMATION

Determining Area with Square Units Name:

Determine the area. Each □ = 1 square unit (u^2).

1) 

2) 

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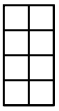
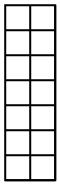
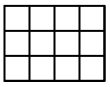
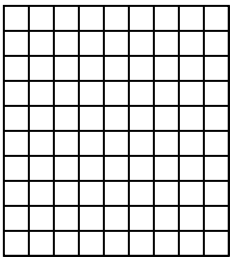
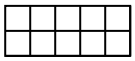
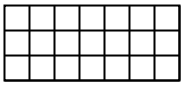
5) 

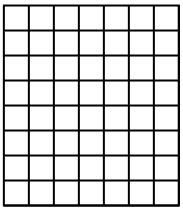
6) 

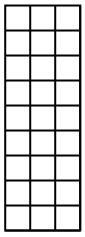
7) 

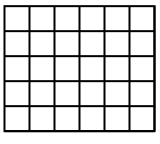
8) 

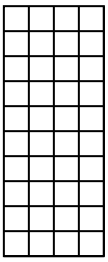
9) 

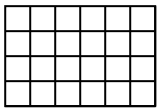
10) 

11) 

12) 

13) 

14) 

15) 

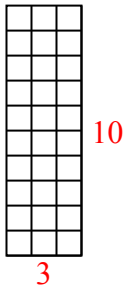
Answers

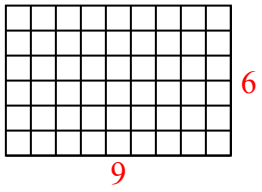
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

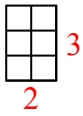
1-10	93	87	80	73	67	60	53	47	40	33
11-15	27	20	13	7	0					

Determining Area with Square Units Name: **Answer Key**

Determine the area. Each □ = 1 square unit (u^2).

1) 

2) 

3) 

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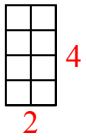
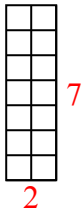
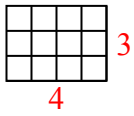
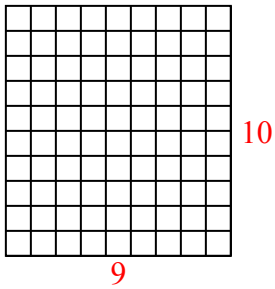
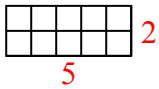
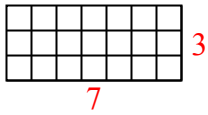
5) 

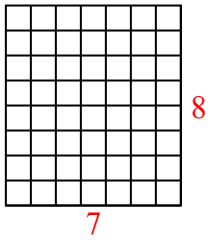
6) 

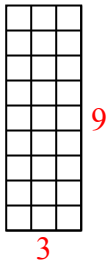
7) 

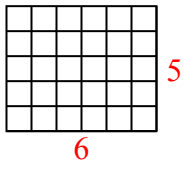
8) 

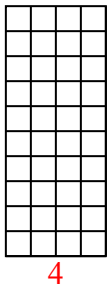
9) 

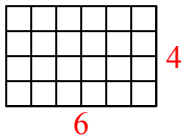
10) 

11) 

12) 

13) 

14) 

15) 

Answers

1. **30 u^2**
2. **54 u^2**
3. **6 u^2**
4. **4 u^2**
5. **8 u^2**
6. **14 u^2**
7. **12 u^2**
8. **90 u^2**
9. **10 u^2**
10. **21 u^2**
11. **56 u^2**
12. **27 u^2**
13. **30 u^2**
14. **40 u^2**
15. **24 u^2**

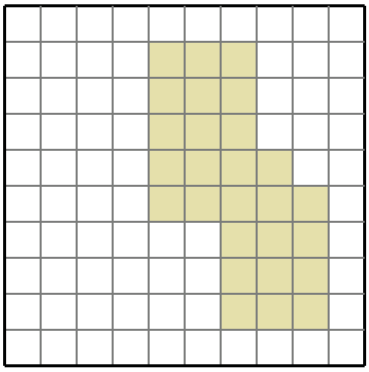
1-10	93	87	80	73	67	60	53	47	40	33
11-15	27	20	13	7	0					

Determining Perimeter

Name:

Find the perimeter of each shaded section. Each block is 1 square unit (u).

1)



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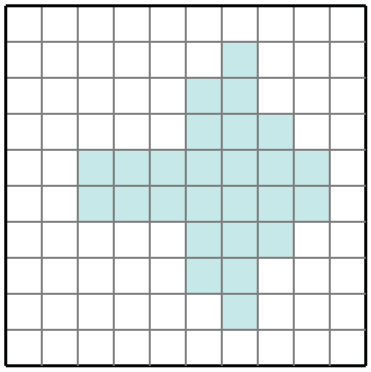

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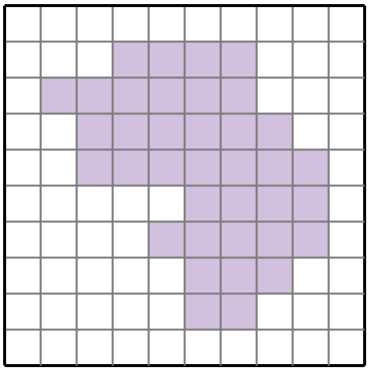

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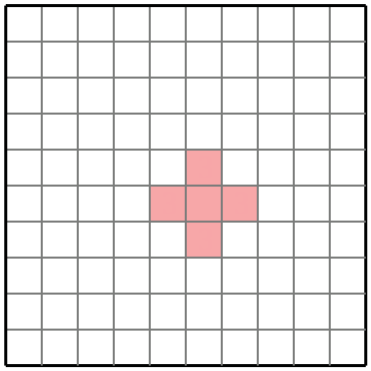

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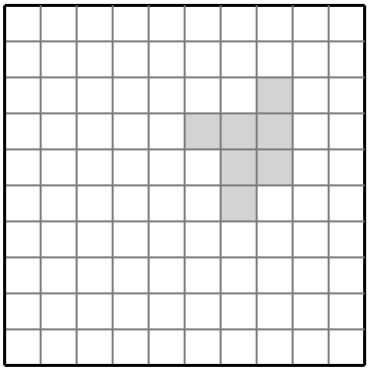

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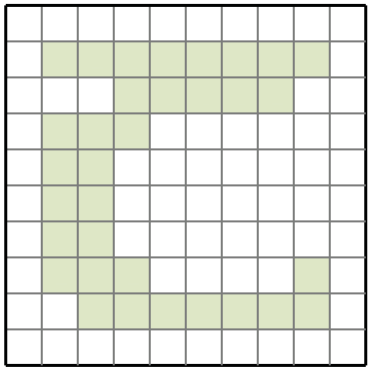

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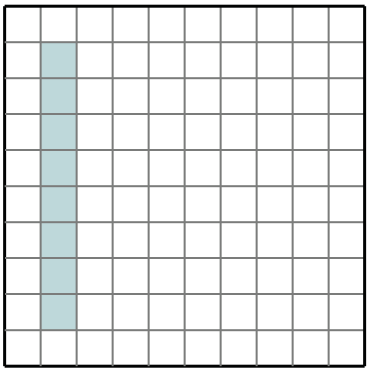

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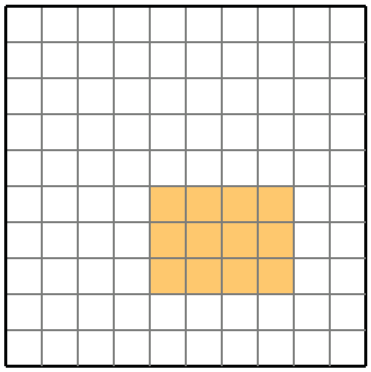


Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

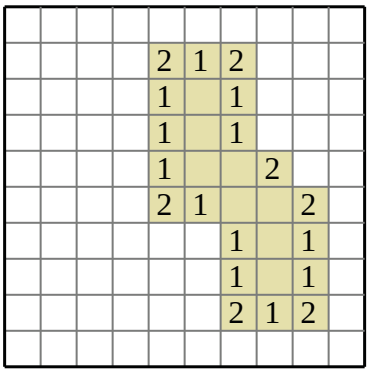
1-8	88	75	63	50	38	25	13	0

Determining Perimeter

Name: **Answer Key**

Find the perimeter of each shaded section. Each block is 1 square unit (u).

1)



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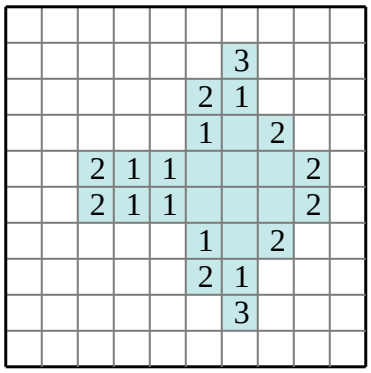

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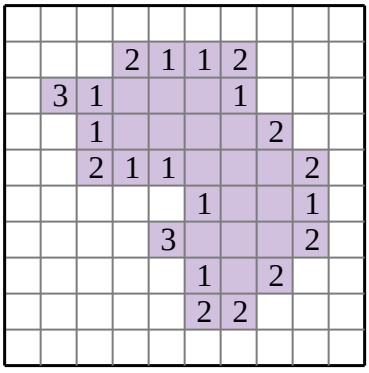

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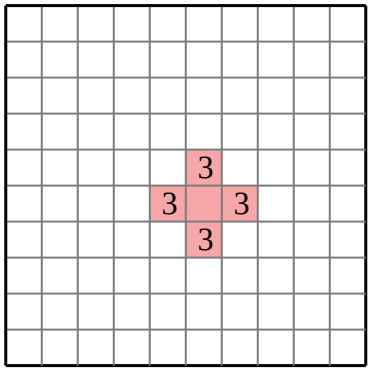
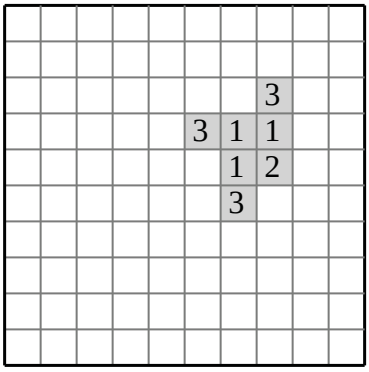


5)



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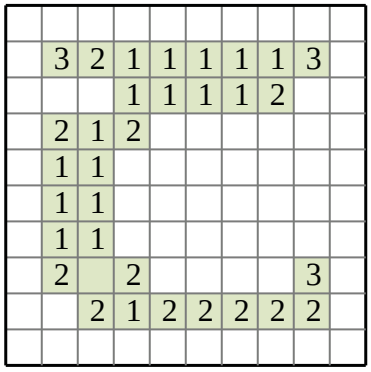
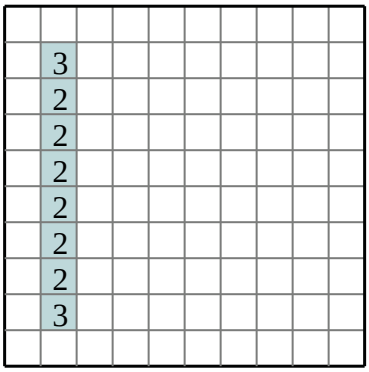
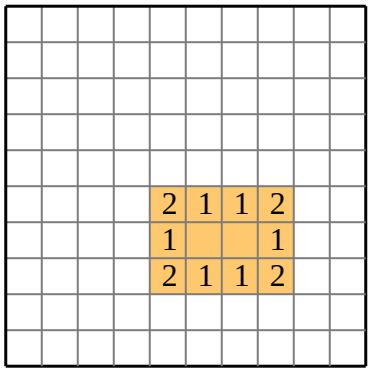


7)



8)



Answers

1. **26**
2. **30**
3. **34**
4. **12**
5. **14**
6. **50**
7. **18**
8. **14**

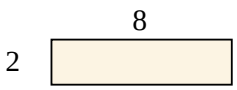
1-8	88	75	63	50	38	25	13	0

Finding Area

Name:

Find the area (in cm) of the rectangles shown.

1)



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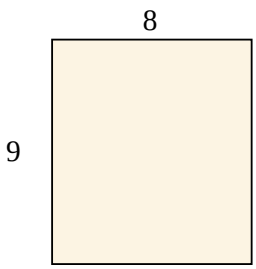

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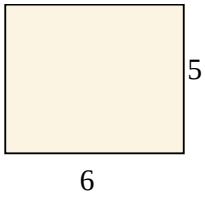
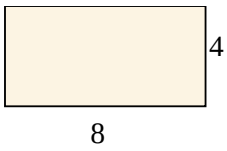
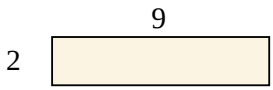


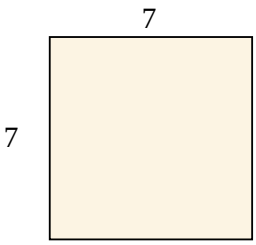
4)



5)



6)



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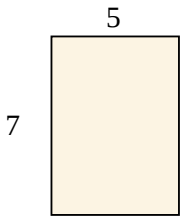

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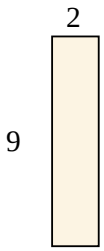

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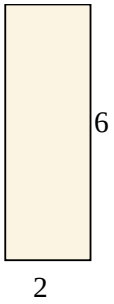

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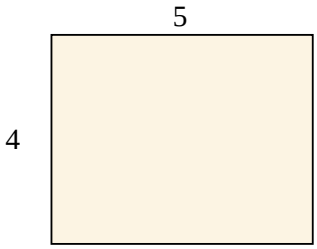

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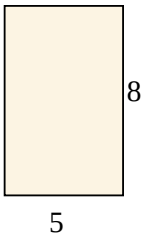

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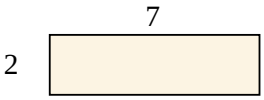
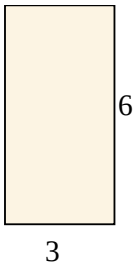


13)



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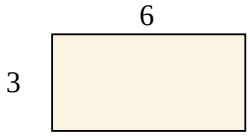
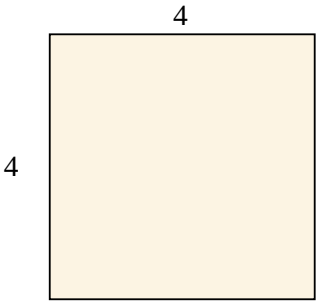


15)



Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

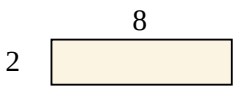
1-10	93	87	80	73	67	60	53	47	40	33
11-15	27	20	13	7	0					

Finding Area

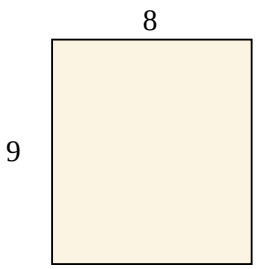
Name: **Answer Key**

Find the area (in cm) of the rectangles shown.

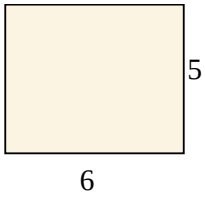
1)



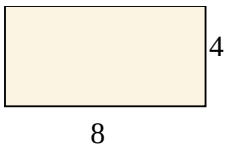
2)



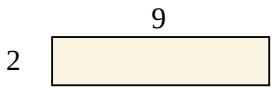
3)



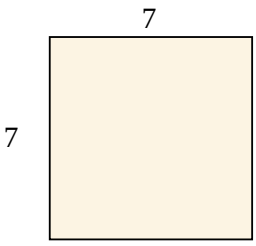
4)



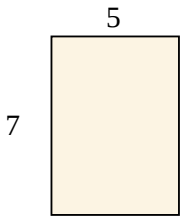
5)



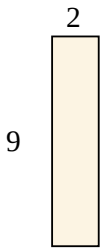
6)



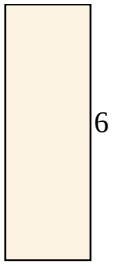
7)



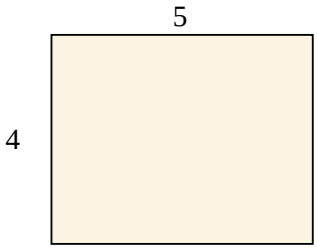
8)



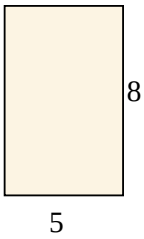
9)



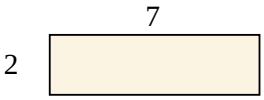
10)



11)



12)



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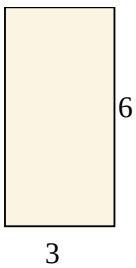

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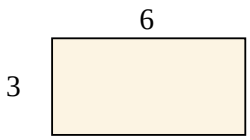
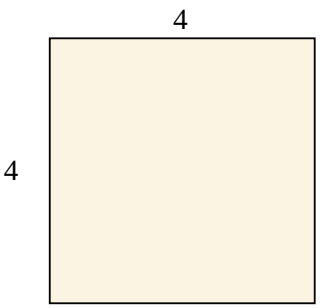


15)



Answers

1. **16 cm²**
2. **72 cm²**
3. **30 cm²**
4. **32 cm²**
5. **18 cm²**
6. **49 cm²**
7. **35 cm²**
8. **18 cm²**
9. **12 cm²**
10. **20 cm²**
11. **40 cm²**
12. **14 cm²**
13. **18 cm²**
14. **18 cm²**
15. **16 cm²**

1-10	93	87	80	73	67	60	53	47	40	33
11-15	27	20	13	7	0					

Finding Perimeter and Area

Name:

Solve the problems.

1) A piece of plywood was cut so its length was 8 feet by 4 feet. What is the area of the wood?

2) A book had a length of 5 inches and a width of 10 inches. What is the area of the book?

3) A rectangle swimming pool was 9 meters wide with a surface area of 90 square meters. What is the length of the pool?

4) An envelope from the post office is 3 inches wide with a total area of 30 square inches. What is the height of the envelope?

5) A book had a length of 5 inches and a width of 8 inches. What is the perimeter of the book?

6) Wendy bought some wrapping paper for Christmas that was 5 feet long and 2 feet wide. What is the area of the wrapping paper she bought?

7) Rachel was cutting out some fabric for a friend. She cut a piece that was 5 centimeters wide and had an area of 20 cm^2. How long was the piece?

8) Faye bought some wrapping paper for Christmas that was 8 feet long and 8 feet wide. What is the perimeter of the wrapping paper she bought?

9) A rug had a length of 2 feet and a total area of 10 ft^2. What is the width of the rug?

10) An envelope from the post office is 6 inches wide and 8 inches long. What is the perimeter of the envelope?

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

1-10	90	80	70	60	50	40	30	20	10	0

Solve the problems.

1) A piece of plywood was cut so its length was 8 feet by 4 feet. What is the area of the wood?

2) A book had a length of 5 inches and a width of 10 inches. What is the area of the book?

3) A rectangle swimming pool was 9 meters wide with a surface area of 90 square meters. What is the length of the pool?

4) An envelope from the post office is 3 inches wide with a total area of 30 square inches. What is the height of the envelope?

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6) Wendy bought some wrapping paper for Christmas that was 5 feet long and 2 feet wide. What is the area of the wrapping paper she bought?

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8) Faye bought some wrapping paper for Christmas that was 8 feet long and 8 feet wide. What is the perimeter of the wrapping paper she bought?

9) A rug had a length of 2 feet and a total area of 10 ft^2. What is the width of the rug?

10) An envelope from the post office is 6 inches wide and 8 inches long. What is the perimeter of the envelope?

Answers

1. **32 ft^2**
2. **50 in^2**
3. **10 m**
4. **10 in**
5. **26 in**
6. **10 ft^2**
7. **4 cm**
8. **32 ft**
9. **5 ft**
10. **28 in**

1-10	90	80	70	60	50	40	30	20	10	0

Finding Perimeter and Area Name:

Solve the problems.

26 in	50 in^2	10 ft^2	10 m	5 ft
28 in	32 ft	10 in	32 ft^2	4 cm

1) A piece of plywood was cut so its length was 8 feet by 4 feet. What is the area of the wood?

2) A book had a length of 5 inches and a width of 10 inches. What is the area of the book?

3) A rectangle swimming pool was 9 meters wide with a surface area of 90 square meters. What is the length of the pool?

4) An envelope from the post office is 3 inches wide with a total area of 30 square inches. What is the height of the envelope?

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10) An envelope from the post office is 6 inches wide and 8 inches long. What is the perimeter of the envelope?

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

1-10	90	80	70	60	50	40	30	20	10	0