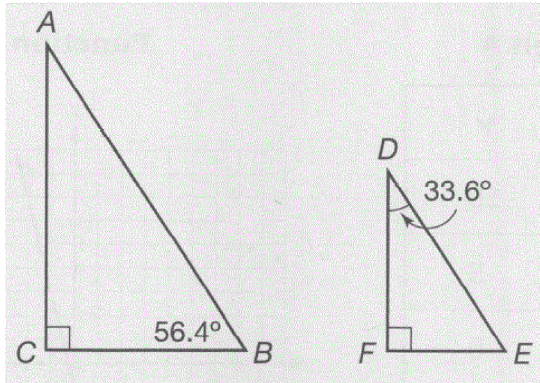


Angle Relationships Practice Test

Multiple Choice

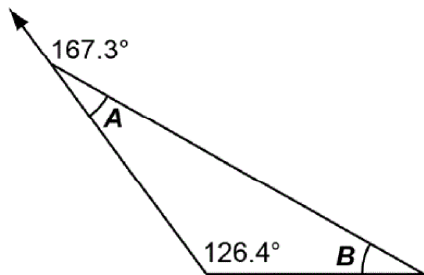
Identify the choice that best completes the statement or answers the question.

1. Amber drew two similar triangles, as shown below.



What is the measure of angle E in degrees?

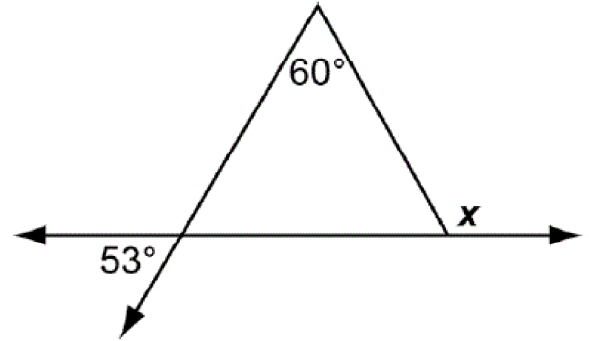
- a. 33.6
- b. 56.4
- c. 90
- d. 180



2. What is the measure of $\angle A$ in degrees?

- a. 12.7
- b. 26.6
- c. 126.4
- d. 180
- e. None of these

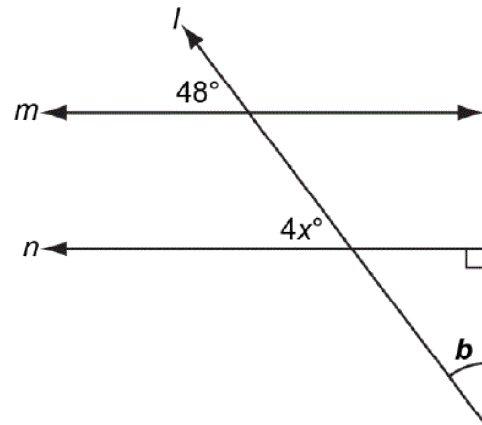
A figure is shown.



3. What is the measure of $\angle x$ in degrees?

- a. 53
- b. 60
- c. 67
- d. 113
- e. none of these

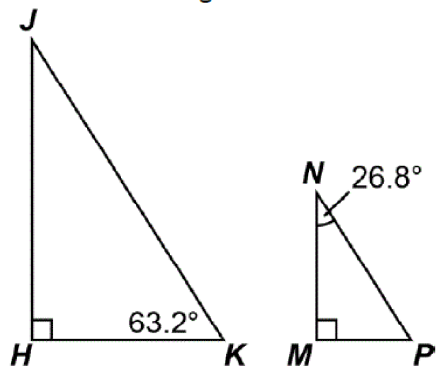
A figure is shown.



4. What is the measure of $\angle b$ in degrees?

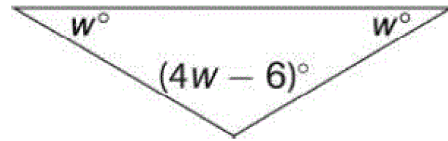
- a. 48
- b. 12
- c. 90
- d. 42
- e. None of these

Two similar triangles are shown.



5. What is the measure of $\angle P$?
- 90
 - 26.8
 - 63.2
 - None of these

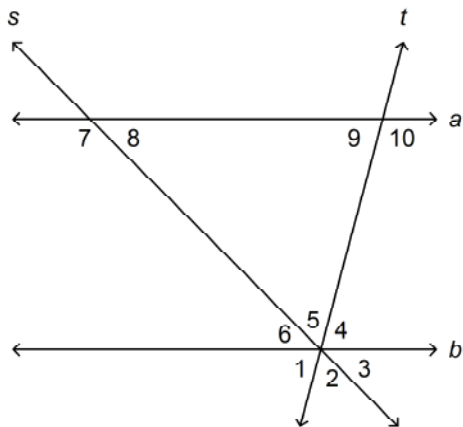
6. Which equation could be used to solve for w and find the measure of each angle?



- None of these.
- $w + 4w - 6 = 180$
- $w + w + 4w - 6 = 360$
- $w + w + 4w + 6 = 180$
- $w + w + 4w - 6 = 180$

Matching

In the diagram below, $a \parallel b$, $m\angle 2 = 60^\circ$, and $m\angle 6 = 45^\circ$. Match each angle with its measure.

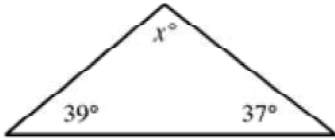


- | | |
|---------------|----------------|
| a. 45° | d. 105° |
| b. 60° | e. 120° |
| c. 75° | f. 135° |

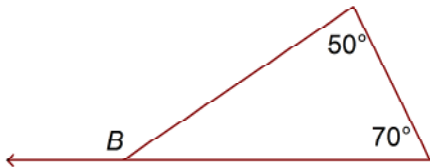
- | | |
|----------------|-----------------|
| 7. $\angle 1$ | 11. $\angle 7$ |
| 8. $\angle 3$ | 12. $\angle 8$ |
| 9. $\angle 4$ | 13. $\angle 9$ |
| 10. $\angle 5$ | 14. $\angle 10$ |

Short Answer

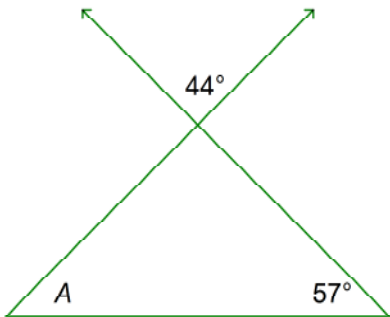
15. Find the value of x . Classify the triangle by its angles.



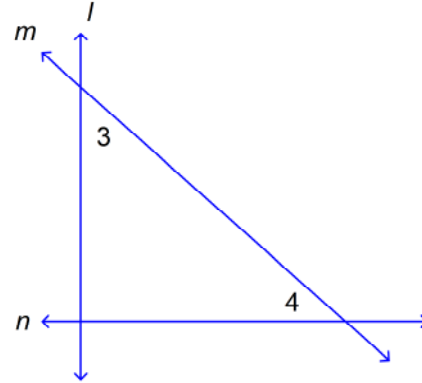
16. What is the measure, in degrees, of the angle marked B ?



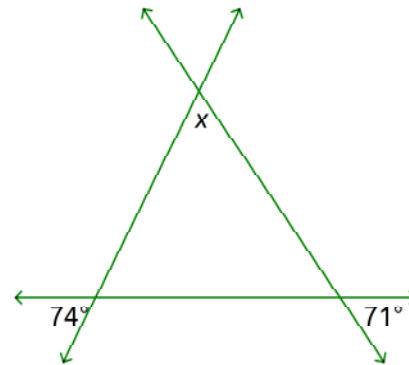
17. What is the measure, in degrees, of the angle marked A ?



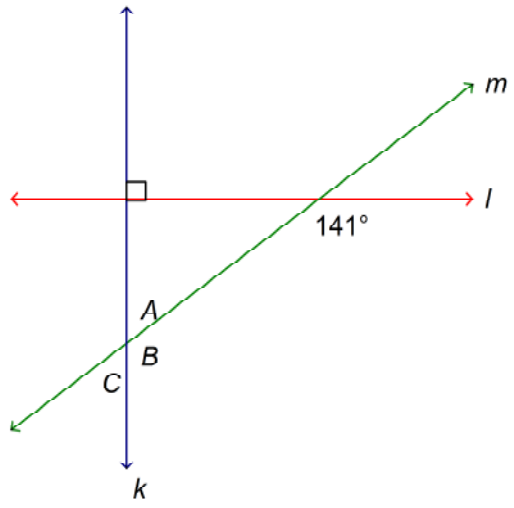
18. In the figure below, $l \perp n$. If $m\angle 3 = 51.5^\circ$, what is the measure of $\angle 4$?



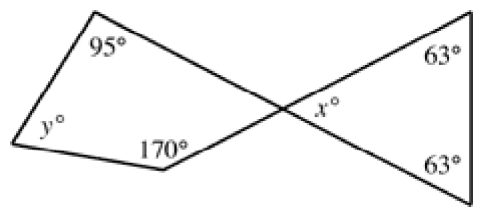
19. Three lines intersect to form the triangle shown below. What is the value of x in degrees?



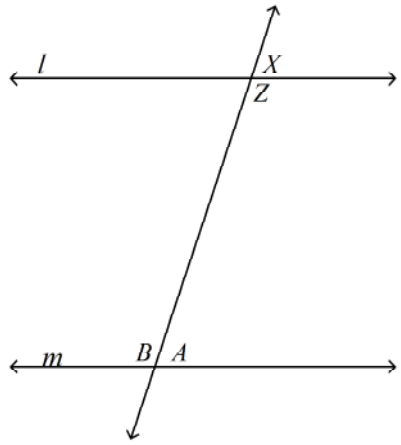
20. In the figure below, Line k is perpendicular to Line l . Based on the information given in the figure, find the measure of $\angle C$.



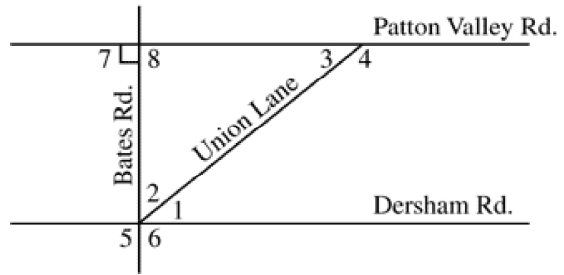
21. Find the values of x and y .



23. Lines l and m are parallel. If $m\angle x = 55^\circ$, find the measures of angles Z , A , and B . Justify your answers.

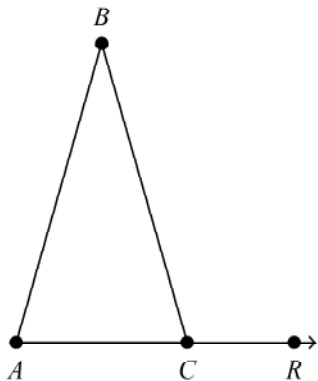


22. In the diagram, Patton Valley Road is parallel to Dersham Road.

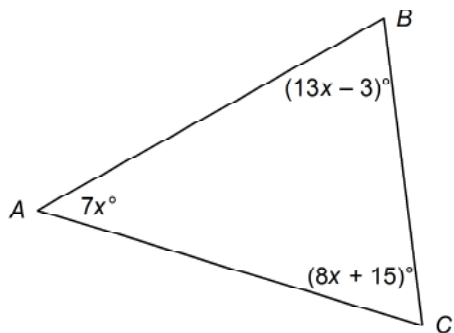


If the measure of $\angle 1$ is 40° , what is the measure of $\angle 2$? Explain your answer.

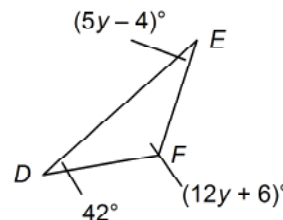
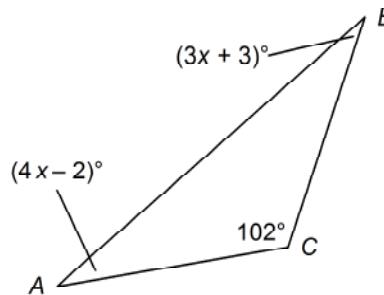
24. $m\angle A = 71^\circ$ and $m\angle B = 38^\circ$. Find $m\angle BCR$.



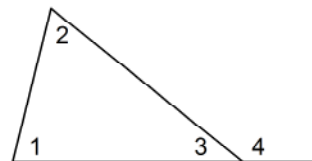
25. Find the measure of each angle in $\triangle ABC$. Show your work.



26. Are $\triangle ABC$ and $\triangle DEF$ similar? Explain. Show your work.



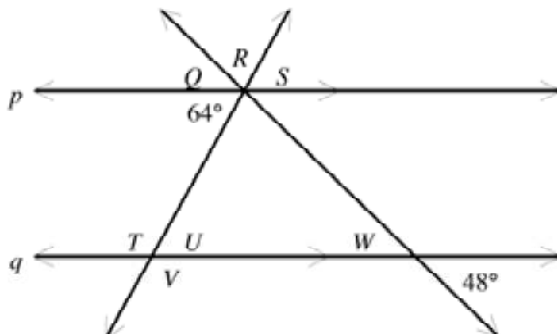
27. Use the triangle below to complete parts a through d, which constitute a proof of the exterior angle theorem.



- Identify the exterior angle and the remote interior angles.
- Complete using the triangle sum theorem:
 $\underline{\quad} + \underline{\quad} + \underline{\quad} = 180^\circ$.
- Identify which angles form a linear pair. Write an equation for the sum of the measures of these angles.
- What can you conclude about the measures of an exterior angle and its remote interior angles? Justify your conclusion by using the information from parts a through c.

Essay

28. In the figure, line p is parallel to line q . (The figure may not be drawn to scale.)



Part A: Which of the labeled angles in the figure have a measure of 64° ? Explain your answer.

Part B: Which of the labeled angles in the figure have a measure of 48° ? Explain your answer.

Part C: What is the measure of $\angle R$? Explain your answer.

Angle Relationships Practice Test Answer Section

MULTIPLE CHOICE

1. B
2. A
3. D
4. D
5. C
6. E

MATCHING

7. C
8. A
9. C
10. B
11. F
12. A
13. C
14. D

SHORT ANSWER

15. 104; obtuse
16. 120
Angle B and the angle next to (or adjacent to) it form a line, so their sum must be 180° . The angle next to angle B must also add up to 180° with the other two angles in the triangle since the sum of the three angles in any triangle is 180° . The angle adjacent to angle B is found by calculating $180 - 50 - 70$ or 60° . So angle B is $180 - 60$ or 120° .
17. 79
The angle at the top of the triangle is congruent to the angle outside the triangle since these are vertical angles. Angle A can be found using the fact that the sum of the three angles in any triangle is 180° . So the measure of angle A is found by calculating $180 - 44 - 57$ or 79° .
18. 38.5°
Lines l , m , and n intersect to form a triangle. Since $l \perp n$, these two lines form a right angle. Since the sum of the interior angles of a triangle is 180° , the sum of $\angle 3$, $\angle 4$, and 90° must equal 180° .
$$m\angle 4 = 180 - 90 - 51.5 = 38.5^\circ$$
19. 35°
Use the property of vertical angles being congruent to recognize that two of the interior angle measures of the triangle are 71° and 74° . Then subtract these two measures from 180° to find the value of x .
$$180 - 71 - 74 = 35^\circ$$

20. 51°
The sum of the interior angles formed by the three lines is 180° . Use this information to find $m\angle A$.

$$m\angle A = 180 - 90 - (180 - 141) = 51^\circ$$

Since $\angle A$ and $\angle C$ are vertical angles, $m\angle C = m\angle A = 51^\circ$.

Since $\angle A$ and $\angle B$ form a straight line, they are supplementary. $m\angle B = 180 - 51 = 129^\circ$

21. $x = 54; y = 41$
22. 50° ; The sum of $m\angle 1$ and $m\angle 2$ is 90° because the angle formed by the sum of the two angles is an alternate interior angle to $\angle 7$. Because $\angle 1$ and $\angle 2$ are complementary angles, $m\angle 2 = 50^\circ$.

23. Sample answer:
Angles Z and X form a linear pair.

$$m\angle Z + m\angle X = 180^\circ$$

$$m\angle Z + 55^\circ = 180^\circ$$

$$m\angle Z = 125^\circ$$

Angle A and angle X are corresponding angles.

$$m\angle A = m\angle X$$

$$m\angle A = 55^\circ$$

Angle B and angle A form a linear pair.

$$m\angle B + m\angle A = 180^\circ$$

$$m\angle B + 55^\circ = 180^\circ$$

$$m\angle B = 125^\circ$$

24. Sample answer: The sum of the interior angles of a triangle is 180° .

$$m\angle A + m\angle B + m\angle BCA = 180^\circ$$

$$71^\circ + 38^\circ + m\angle BCA = 180^\circ$$

$$m\angle BCA = 71^\circ$$

Also $\angle BCA$ and $\angle BCR$ form a linear pair.

$$m\angle BCA + m\angle BCR = 180^\circ$$

$$71^\circ + m\angle BCR = 180^\circ$$

$$m\angle BCR = 109^\circ$$

25. The sum of the angles of the triangle is 180° .

$$7x + (13x - 3) + (8x + 15) = 180$$

$$28x + 12 - 12 = 180 - 12$$

$$\frac{28x}{28} = \frac{168}{28}$$

$$x = 6$$

$$m\angle A = 7(6) = 42^\circ$$

$$m\angle B = 13(6) - 3 = 78 - 3 = 75^\circ$$

$$m\angle C = 8(6) + 15 = 48 + 15 = 63^\circ$$

Rubric

1 point for each angle; 1 point for solving for x

26. First, find the measures of two angles in $\triangle ABC$ using the triangle sum theorem.

$$(4x - 2) + (3x + 3) + 102 = 180$$

$$7x + 103 - 103 = 180 - 103$$

$$\frac{7x}{7} = \frac{77}{7}$$

$$x = 11$$

$$m\angle A = 4(11) - 2 = 44 - 2 = 42^\circ$$

$$m\angle C = 102^\circ$$

Next, find the measures of two corresponding angles in $\triangle DEF$ using the triangle sum theorem.

$$42 + (5y - 4) + (12y + 6) = 180$$

$$17y + 44 - 44 = 180 - 44$$

$$\frac{17y}{17} = \frac{136}{17}$$

$$y = 8$$

$$m\angle D = 42^\circ$$

$$m\angle F = 12(8) + 6 = 96 + 6 = 102^\circ$$

So, $m\angle A = m\angle D$ and $m\angle C = m\angle F$. The triangles are similar by the angle-angle similarity criterion.

Rubric

1 point for answer; 2 points for explanation

27. a. The exterior angle is $\angle 4$. The remote interior angles are $\angle 1$ and $\angle 2$.
 b. $m\angle 1$; $m\angle 2$; $m\angle 3$
 c. $\angle 3$ and $\angle 4$ are a linear pair, so $m\angle 3 + m\angle 4 = 180^\circ$.
 d. The measure of an exterior angle is equal to the sum of its remote interior angles.

$$m\angle 1 + m\angle 2 + m\angle 3 = m\angle 3 + m\angle 4$$

$$m\angle 1 + m\angle 2 + m\angle 3 - m\angle 3 = m\angle 3 + m\angle 4 - m\angle 3$$

$$m\angle 1 + m\angle 2 = m\angle 4$$

Rubric

- a. 1 point
 b. 1 point
 c. 1 point
 d. 2 points

ESSAY

28. **Part A:** $\angle S$ has a measure of 64° because $\angle S$ and the 64° angle are vertical angles. $\angle U$ has a measure of 64° because $\angle U$ and the 64° angle form alternate interior angles.
Part B: $\angle Q$ has a measure of 48° because $\angle Q$ and the 48° angle are alternate exterior angles. $\angle W$ has a measure of 48° because $\angle W$ and the 48° angle are vertical angles.
Part C: $m\angle R = 68^\circ$; *Sample explanation:* The sum of the measures of the 64° angle, $\angle Q$, and $\angle R$ is 180° . From **Part B**, you know that the measure of $\angle Q$ is 48° . To find the measure of $\angle R$, subtract the sum of 64° and 48° from 180° : $180 - (64 + 48) = 68$