

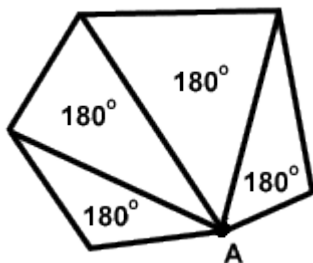
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Triangles

## Triangles

- Introduction to triangles
- Facts of triangles
- Special triangles
- Classifying triangles based on their angles
- Classifying triangles based on their sides
- Similarity in triangles
- Practice questions

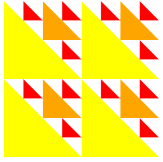
The most important fact about triangles is that any polygon can easily be divided into a set of triangles, by just drawing diagonals of the polygon. This polygon has 6 sides and 3 diagonals yielding 4 triangles.



***Number of triangles that can be formed by n-sided polygon is  $n-2$ .***

### Facts of triangles

- The sum of all three angles of a triangle is equal to 180 degree.
- The longest side is always opposite to the largest angle, shortest side is always opposite to the shortest angle.
- No side of a triangle can be as large as the sum of other two sides.



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## Triangles

- They can be classified according to their sides or angles

### Special triangles

Triangles when classified according to the lengths of the sides, they fall into one of these categories:

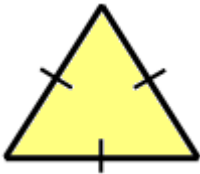
- Scalene : If none of the sides of the triangle are equal.



- Isosceles : If two sides are equal.



- Equilateral: All three sides are equal.

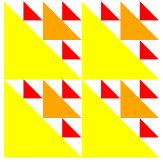


Triangles when classified according to their angles, they fall into one of these categories:

- Acute: If the angles of triangle are all acute.



- Obtuse: If triangle has an obtuse angle.



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- Right: If one angle is right angle.

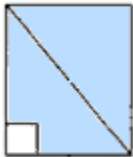


- Equilateral: If all the angles are equal.

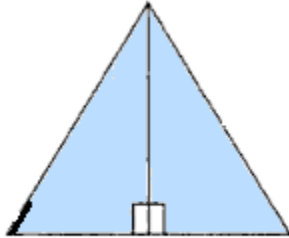
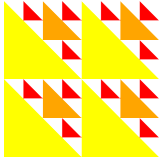


There are two more special triangles called 45 -45 -90 and 30 -30 -60 right triangles.

45 -45 -90 comes from a square.

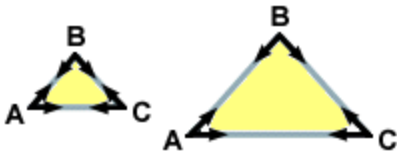


30 – 30 – 60 comes from an equilateral triangle.

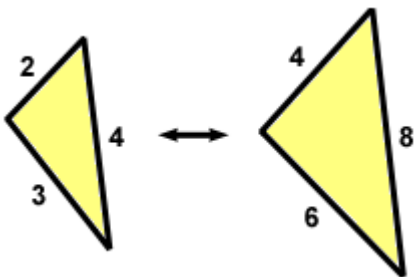


### Similarity in triangles

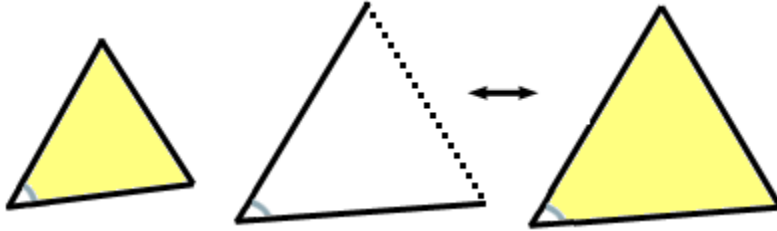
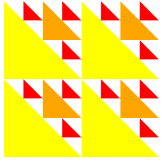
- AA (Angle- Angle): If two pairs of corresponding angles are congruent, then the sides are proportional, then triangles are said to be similar.



- SSS ( Side-Side-Side): If the sides are in proportion, then the triangles are said to be similar.

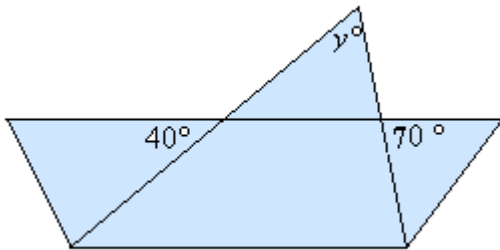


- SAS ( Side-Angle-Side): If two pairs of corresponding sides are in proportion and the included angles are equal, then the two triangles are said to be similar.



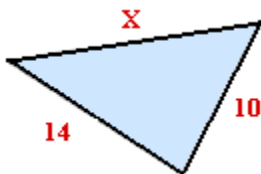
**Practice Questions**

1. What is the angle  $y$ ?

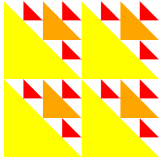


- A. 70
- B. 60
- C. 80
- D. 65

2. What are the possible values of  $x$ ?



- A.  $5 < x < 20$
- B.  $4 < x < 24$
- C.  $2 < x > 24$



D.  $2 > x < 24$

3. One leg of a 45-45-90 degree is 12 cm long. What is its hypotenuse?

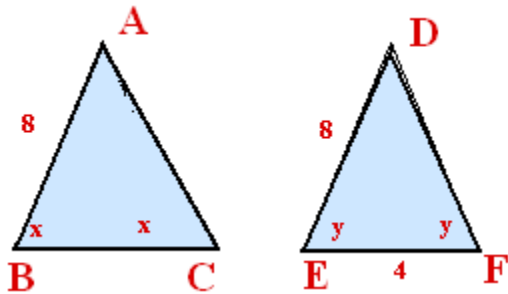
A. 14

B. 13.5

C.  $12\sqrt{2}$

D.  $10\sqrt{3}$

4. How much more is the perimeter of triangle ABC compared with triangle DEF, given  $x = 60$  deg. Figures are not drawn to scale.



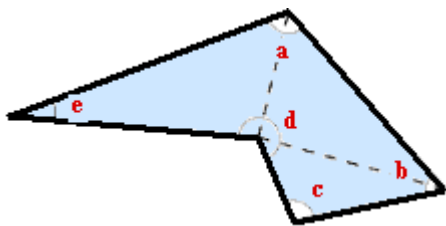
A. 5

B. 4

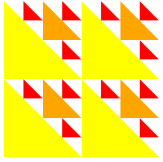
C. 3

D. 8

5. What is the average measure of the five angles in this figure?

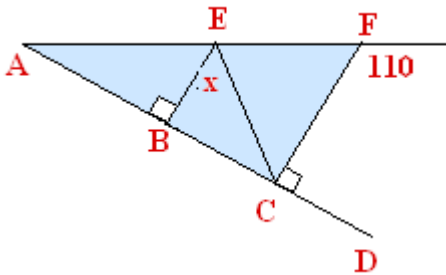


A. 100



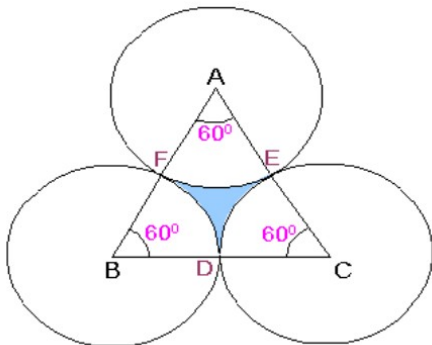
- B. 108
- C. 110
- D. 120

6. What is the value of  $x$  if  $EB$  is perpendicular to  $AD$ ,  $FC$  is perpendicular to  $AD$ ,  $AE = EF$ .

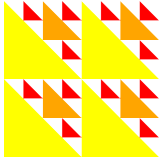


- A. 70
- B. 60
- C. 50
- D. 80

7. What is the area of the shaded region?



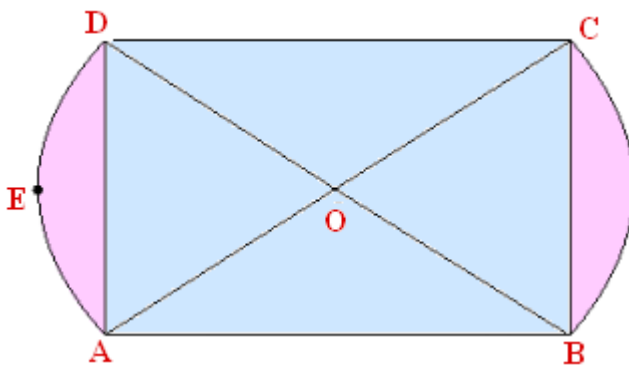
- A. 8.65 sq. cm
- B. 7.86 sq. cm



C. 5.23 sq. cm

D. 2.89 sq. cm

8. Find the area of the pink colored region. Given  $AB = 40$ , two circular flower beds are at sides  $AD$  and  $BC$  With center at the intersection of their diagonals. Then the area of the flower beds is:



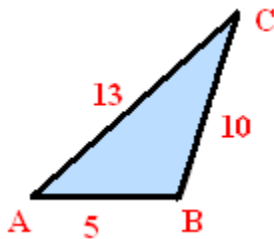
A. 230

B. 228

C. 300

D. 350

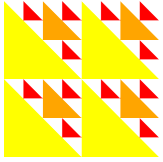
9. List the angles from smallest to largest.



A.  $C > A < B$

B.  $C < A < B$

C.  $A < B < C$

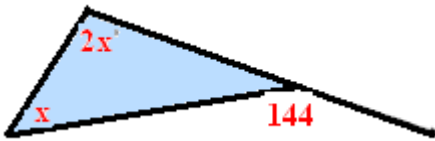


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D.  $B < C < A$

10. What is the value of  $x$ ?



A. 98

B. 48

C. 45

D. 50

### Answers

1. A

2. B

3. C

4. B

5. B

6. A

7. B

8. B

9. B

10. B