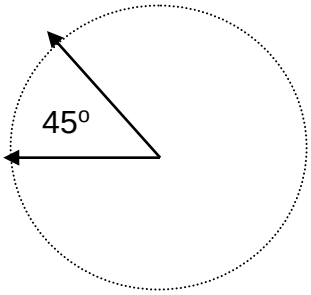
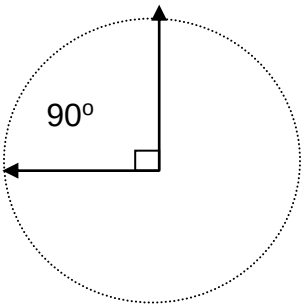
ANGLES OF LINES AND TRIANGLES

Angles



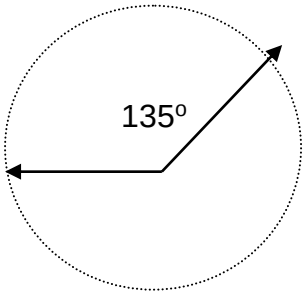
A 45º angle is $\frac{1}{8}$ of a pie.

Any angle less than 90º is called an **acute** angle.



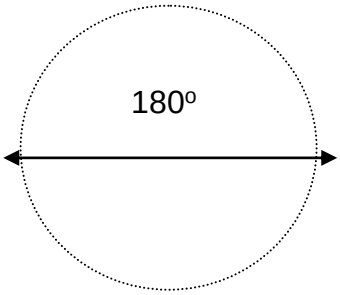
A 90º angle is $\frac{1}{4}$ of a pie.

Any 90 º angle is called a **right** angle and marked by a little square in its corner.



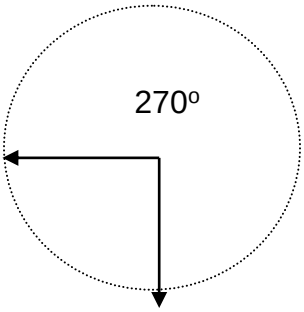
A 135º angle is $\frac{3}{8}$ of a pie.

Any angle greater than 90º but less than 180º is called an **obtuse** angle.



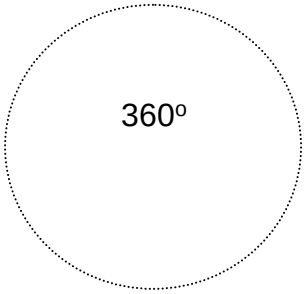
A 180º angle is half a pie: it's a straight line.

Any 180º angle is called a **straight** angle.



A 270º angle is $\frac{3}{4}$ of a pie.

Any angle greater than 180º but less than 360º is called a **reflex** angle.

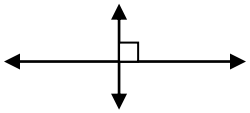


A 360º angle is a full circle.

Lines

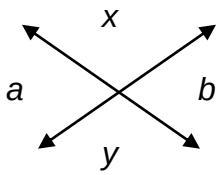
1. Two lines are **parallel** (II) when they run next to each other but never touch.

2. Two lines are **perpendicular** ($\perp$) when they cross at a right angle.



3. Two intersecting lines always form four angles. The sum of these angles is 360^o.

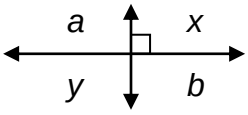
$a^o + x^o + b^o + y^o = 360^o$



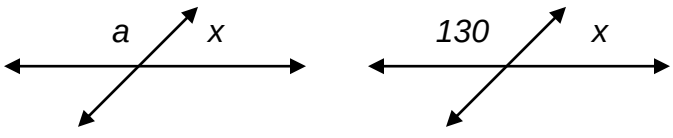
4. The opposite angles created by intersecting lines are always equal: *a=b, x=y.*

$2a^o + 2x^o = 360^o$

5. Two perpendicular intersecting lines always form four 90^0 ("right") angles.



6. If the sum of any two angles equals 180^o, those angles are **supplementary**. If you know either one of them, you can find the other by subtracting the first from 180^o.



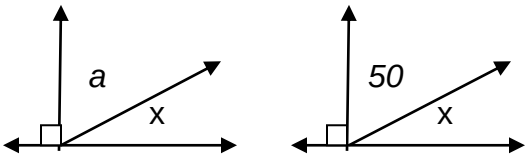
a + x = 180

130 + x = 180

180-130 = 50

$x = 50^o$

7. If the sum of any two angles equals 90º, **those angles are complementary**. If you know either one of them, you can find the other by subtracting the first from 180º.



a + x = 90

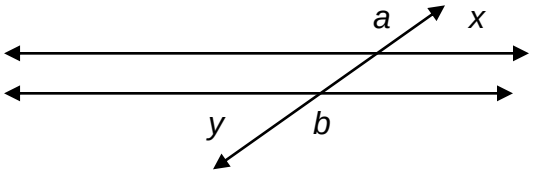
50 + x = 90

90 - 50 = 40

x = 40º

In the example above, a + x has to equal 90º because the **supplementary** angle is marked as a right angle.

8. When two parallel lines are intersected by a third line, two kinds of angles are created: large and small. Therefore, *a* = *b* and *x* = *y.*

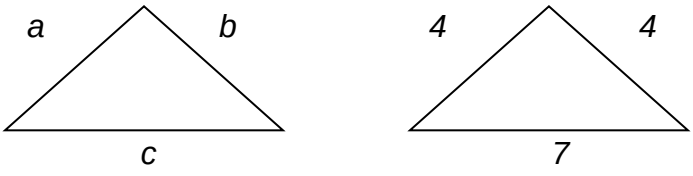


9. When two parallel lines are intersected by a third line, all large angles equal each other. All small angles equal each other. Therefore, *a* = *b* and *x* = *y.*

10. When two parallel lines are intersected by a third line, the sum of any large angle and any small angle is 180º, because they are **supplementary** angles. Therefore, *a* + *x* = 180 and *b* + *y* = 180.

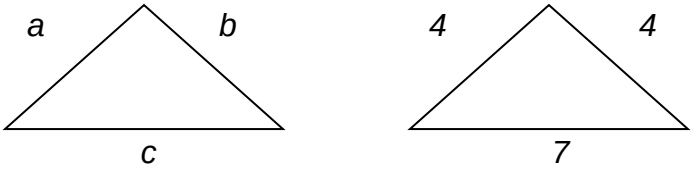
Triangles

11. Every triangle has three sides. If you add the lengths of any two of those sides, the sum will always be larger than the length of the third side.



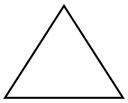
a + b > c
a + c > b
b + c > a
4 + 4 > 7
7+ 4 > 4

12. The **perimeter** of any triangle is the sum of its three sides: *a* + *b* + *c*

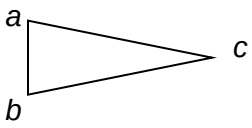


P = a + b + c
P = 4 + 4 + 7
P = 15

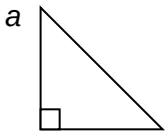
13. Every triangle has three angles. Their sum is 180º.



EQUILATERAL



ISOCELES



RIGHT

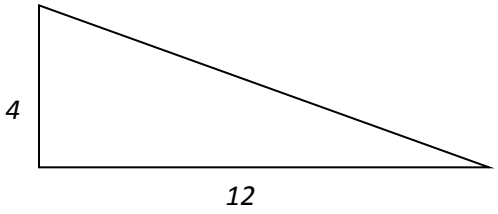
14. **Equilateral** triangles have three equal sides and three 60º angles: $3 * 60^{o} = 180^{o}$

15. **Isoceles** triangles have two equal sides and two equal angles: $a^{o} = b^{o}$. Therefore, $(2 * a) + c = 180^{o}$

16. **Right** triangles have one 90º angle opposite a long side called a **hypoteneuse.** The other two angles always equal each other. Therefore, $(2 * a) + 90 = 180^{o}$. The square in the corner of any right angle shows that it is 90º.

17. The smallest angle in a triangle is opposite the triangle's shortest side, and the largest angle is opposite the triangle's longest side.

18. The **area** of a triangle equals its height times its base, divided by two: $A = ½ (b * h)$.

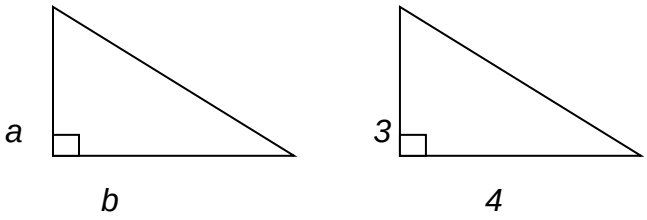


$A = ½\ b * h$

$A = ½ (12*4)$

$A = ½ (48)$

19. The **Pythagorean theorem** lets you find the third side of any **right triangle** if you know the other two. If you square the length of each shorter side and add those squares together, they equal the square of the hypoteneuse: $a^2 + b^2 = c^2$.



$a^2 + b^2 = c^2$

$3^2 + 4^2 = c^2$

$9 + 16 = c^2$

$25 = c^2$

$\sqrt{25} = c$

$5 = c$

Created Fall 2012