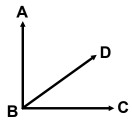
Geometry Unit Notes

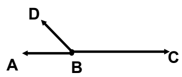
Complementary angles add up to 90°



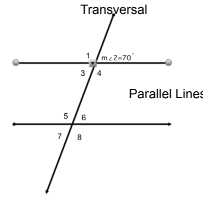
∠ABD + ∠DBC =90°

Supplementary angles add up to 180°

∠ABD + ∠DBC =180°



Types of Angles



Adjacent

-Share a vertex

-Next to each other

i.e. ∠1 and ∠2, ∠2 and∠4, ∠ 4and ∠3, ∠3 and∠1, ∠5 and ∠6, ∠6 and ∠8, ∠8 and ∠7, ∠7 and ∠5.

Vertically opposite

-the opposite angles formed when 2 lines intersect.

-vertically opposite angles are congruent

i.e. ∠1 and ∠4, ∠2 and ∠3, ∠5 and ∠8, ∠6 and∠7.

Alternate exterior

-on opposite sides of the transversal and on the outside of the parallel lines

-Alternate exterior angles are equal

i.e. ∠1 and ∠8 and ∠2 and ∠7

Alternate interior

-on opposite sides of the transversal and on the inside of the parallel lines

-Alternate interior angles are equal

i.e. ∠3 and ∠6 and ∠4 and ∠5

Corresponding

-they are in the same position from one line to the other

-usually one of them is inside and one outdie the parallel lines

-corresponding angles are equal.

i.e. ∠1 and ∠5, ∠2 and ∠6, ∠3 and ∠7, ∠4 and ∠8.

Interior Angles of a Polygon

The sum of the angles in a triangle is equal to 180°.

The sum of the angles in other polygons is based on the number of triangles that can be drawn from 1 vertex. The number of triangles times 180° is the sum of the interior angles.

The rule is (n-2) x180° where

n=the number of sides in the polygon.

**In a triangle n=3 so

(n-2) x 180°

=(3-2) x 180°

=(1) x 180°

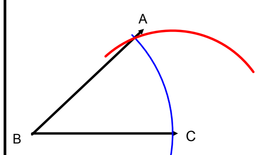
=180°

Sum of Interior Angles in a Polygon

Name of Polygon	Sum of Angles (n-2) x180°
Triangle	180°
Quadrilateral	360°
Pentagon	540°
Hexagon	720°
Septagon	900°
Octagon	1080°
Nonagon	1260°
Decagon	1440°

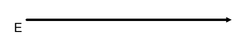
How to Copy an Angle using a Compass and Ruler

Create ∠ DEF ≅ to ∠ABC

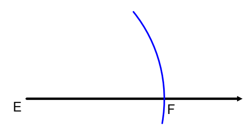


Steps

1-Draw a ray and label one end point E



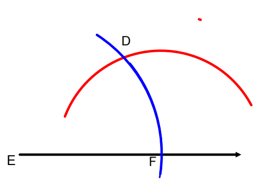
2- use your compass to measure the length of BC and then make an arc of the same length from point E. This intersection point becomes point F.



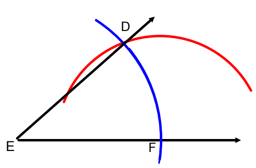
Steps

3-use your compass to measure the distance between points A and C on the arc that you drew.

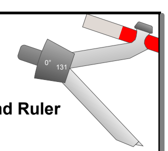
4-Keep your compass set at the same distance and place the compass tip at point F. Make an arc. The intersection point of the two arcs is point D.



5- Join Point D to Point E to create ∠ DEF



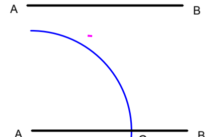
How to Create a 60° Angle using a Compass and Ruler



Steps

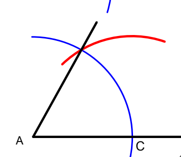
1-Draw Line Segment AB

2-Place your compass on Point A and make an arc. Label the point of intersection of the arc and the line as C

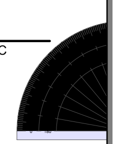


3-Keep your compass the same width and make an arc from C. Make sure that it intersects the arc you just made.

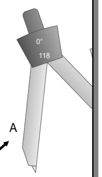
4-Join the point of intersection of the 2 arcs back to the point A. This will create a 60° angle



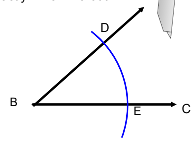
** you can verify if you are correct using a protractor.



How to Bisect an Angle using a Compass and Ruler

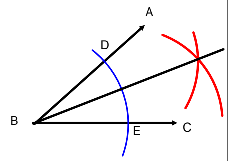


Bisecting an angle using the geometry tools cuts an angle exactly in half without having to measure or calculate



Steps

1-From Point B create an arc of any size that crosses both arms of the angle. Label the points of intersection as Point D and E.

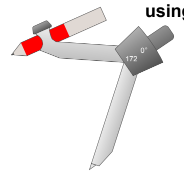


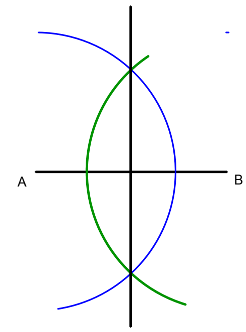
2- Place the point of your compass at Point E and open the compass to a distance of more than half the distance between D and E. Make an arc.

3-Keeping your compass open the same distance place the point of the compass at Point D and make an arc. Make sure it crosses the first one.

4-Join the point of intersection of the two arcs back to Point B to create 2 equal angles.
** you can verify if you are correct using a protractor.

How to Create a 90° Angle (Right Bisector) using a Compass and Ruler (The FISH)





A right bisector will cut a line in half at a 90° angle.

Steps

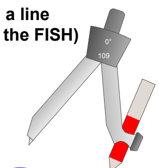
1-From A, set your compass to a distance of over half the line length, and draw an arc above and below the line (A half circle).

2-Keep your compass at the same width and repeat step 1 but from point B

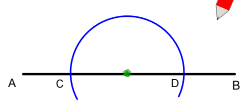
3-Draw a line using a ruler to connect the points of intersection of the arcs. Make sure to connect the point of intersection above and below the line AB.

** you can verify if you are correct using a protractor.

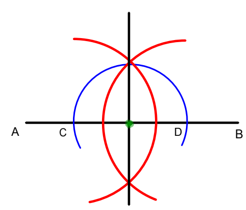
How to Create a 90° Angle from a point on a line using a Compass and Ruler (The Frown then the FISH)



Steps



1-From the Point on AB, make an arc that crosses line AB in 2 places.

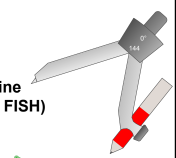


2- From the point of intersection c open your compass to more than half the distance between C and D. Make arcs that go above and below the line.

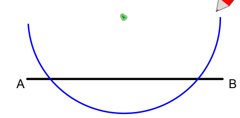
3- Join the two points of intersections of the arcs through the points using a ruler

** you can verify if you are correct using a protractor.

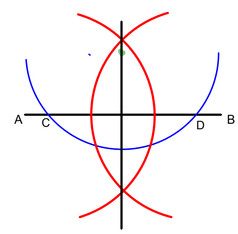
How to Create a 90° Angle from a point off a line using a Compass and Ruler (The Smile then the FISH)



Steps



1-From the Point, make an arc that crosses line AB in 2 places.



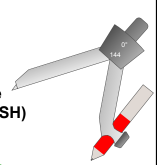
2- From the point of intersection c open your compass to more than half the distance between C and D. Make arcs that go above and below the line.

3- Repeat Step 2 from Point D

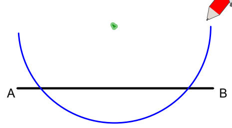
4- Join the two points of intersections of the arcs through the points using a ruler

** you can verify if you are correct using a protractor.

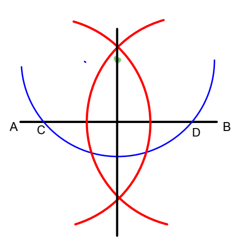
How to Create a 90° Angle from a point off a line using a Compass and Ruler (The Smile then the FISH)



Steps



1-From the Point, make an arc that crosses line AB in 2 places.



2- From the point of intersection c open your compass to more than half the distance between C and D. Make arcs that go above and below the line.

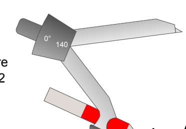
3- Repeat Step 2 from Point D

4- Join the two points of intersections of the arcs through the points using a ruler

** you can verify if you are correct using a protractor.

Transformations: How to Translate (slide) an object.

The object stays the exact same size and orientation. It is slide to a new location according to the length and direction of the translation vector (arrow).



Steps

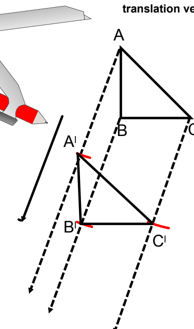
1- Create dotted lines (paths) that are parallel to the translation vector(use 2 rulers or set square).

2- Set your compass to the distance (length) of the translation vector.

3- Continue step 2 for all points.

4-Connect the points to create the image figure.

5- Do a visual check that the figure looks correct and check if the lines are parallel.



Transformations:
How to Reflect (flip) an object.

The object stays the exact same size but the orientation is reversed (mirror image). It is flip to a new location over the reflection line.

Steps

1- Use your protractor to create a 90° angle to the reflection line.

2- Draw paths from each point that are perpendicular to the reflection line. They must go through the reflection line to the other side at least as far.

3- Place your compass point of the reflection line and measure to point A. Flip over the compass and mark off point A' on the same path but on the opposite side of the reflection line. Repeat for all other points.

4- Redraw the figure and label each point. The figure should look like a mirror image of the original.