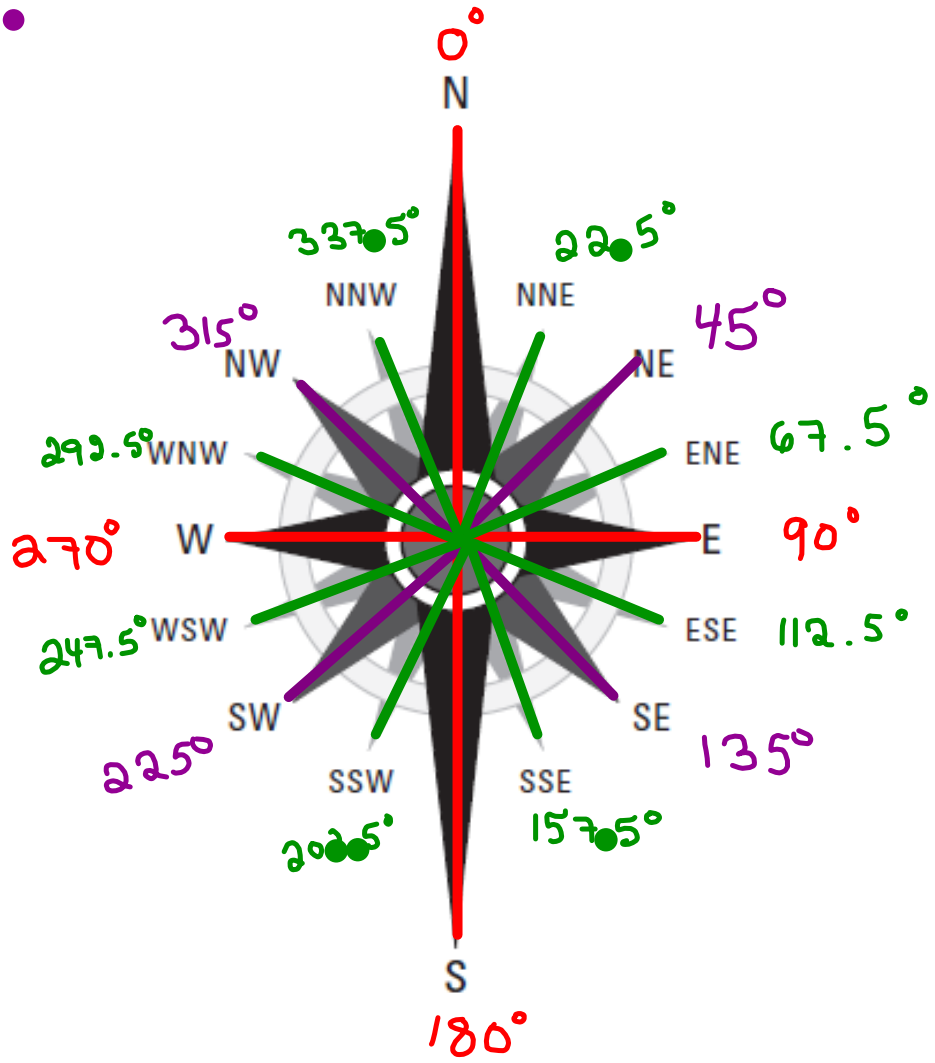
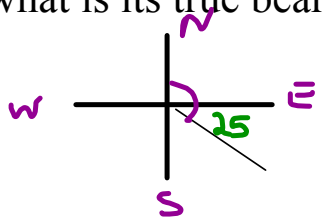

0°
N
337.5°
22.5°
NNW
NNE
315°
45°
NW
NE
292.5°
WNW
ENE
67.5°
270°
W
E
90°
247.5°
WSW
ESE
112.5°
225°
SW
SE
135°
SSW
SSE
202.5°
157.5°
S
180°

EXERCISE:

1) If a boat is travelling 25° south of straight east, what is its true bearing?

???

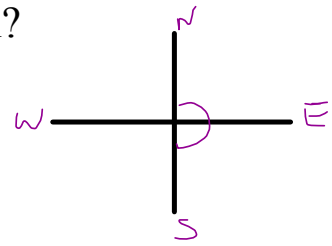
(Solution - 115°)



2) What is the true bearing of a boat travelling south?

???

(Solution - 180°)

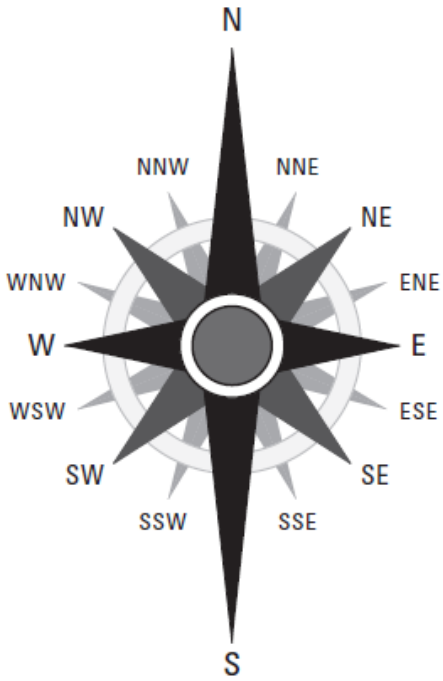


3) What is the true bearing of a boat travelling north-northwest?

???

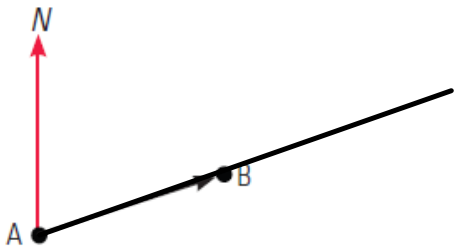
(Solution - 337.5°)

NAVIGATIONAL BEARING	
Direction	*Bearing*
N	0°
NNE	22.5°
NE	45°
ENE	67.5°
E	90°
ESE	112.5°
SE	135°
SSE	157.50°
S	180°
SSW	202.5°
SW	225°
WSW	247.5°
W	270°
WNW	292.5°
NW	315°
NNW	337.5°

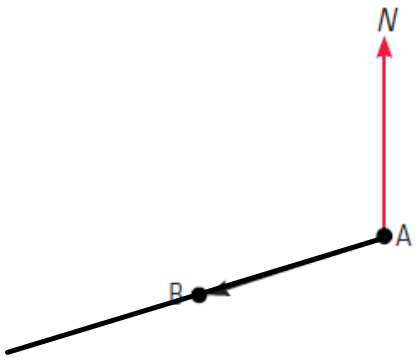


Examples...

a) Determine the true bearing between A and B.



b) Determine the true bearing between A and B.



Angle Constructions... 1) Perpendicular Bisector

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STEP 1:

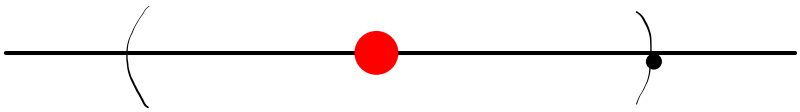
Put the compass point at the mark you made. Open the compass slightly and make two more marks on each side of the first mark. Ensure they are the same distance from the first mark.

STEP 2:

Widen the compass a bit more, and place the compass point at one of the new marks. Make a small arc, then do the same thing after placing the compass point at the other new mark. Ensure the two arcs intersect each other.

STEP 3:

Draw a line segment that goes between or through the point where the arcs intersect and the first mark you made. The two line segments are perpendicular to each other, and therefore form a 90° (right) angle.



Angle Constructions... 2) Replicate an Angle

Page 277

STEP 1:

b) To replicate any existing angle, follow these steps.

Use a compass to lightly draw an arc centred at the vertex of the original angle.

STEP 2:

Use a ruler to draw one side of the new angle, and draw an arc of the same radius and arc length as the one you just drew on the original angle.

STEP 3:

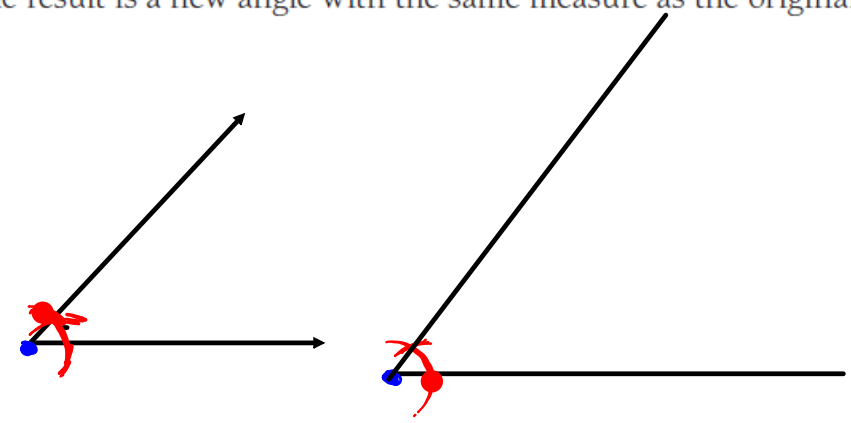
Bring the compass up to the original angle, and set it so that its point and the tip of the pencil touch the points where the original arc intersects the sides of the angle.

STEP 4:

Place the compass point over to the point of intersection of the side of the new angle and the new arc. Draw a short arc through the new arc.

STEP 5:

Use the ruler to draw the other side of the angle, from the left end of the first side (the vertex) through the point of intersection of the two arcs. The result is a new angle with the same measure as the original.



Let's try a few...

How Can We Bisect An Angle???

Step:

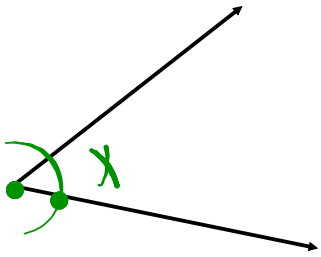
PLace your compass on the vertex and extend the pencil to a point on one of the rays. Draw an arc on that ray. Then swing the compass and draw the arc on the other ray.

angle bisector: a segment, ray, or line that separates two halves of a bisected angle

Step 2:

Place your compass on one of the new arcs and Stretch your compass pencil to the other arc. Now swing the compass so that it's pencil will make a mark between the two rays. Pick up the compass (do not change it's length) and place the compass and make a mark from the other arc.

Step 3: Draw a line segment from the vertex to the point of intersection



How Can We Bisect An Angle???

angle bisector: a segment, ray, or line that separates two halves of a bisected angle

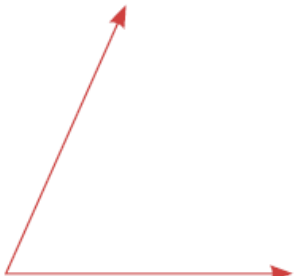
Method #1 - Paper Folding

Method #2 - Protractor and straight edge

Method #3 - Compass and straight edge

Example

Accurately bisect an angle like the one shown here.



SOLUTION

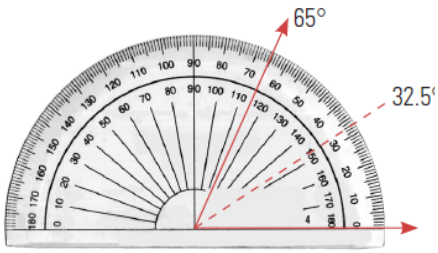
Measure the angle using a protractor. Divide that measure by 2.

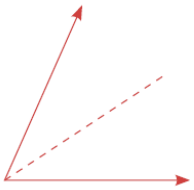
The angle measure is 65°.

65 ÷ 2 = 32.5

Use a protractor to measure and mark off a 32.5° angle.

Draw a line segment from the vertex to the mark you made.



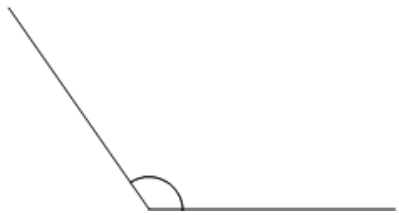


The angle has been successfully divided into two equal parts.

ALTERNATIVE SOLUTION

Trace the angle on above onto a sheet of paper. Place one side of the angle over the other side, creating a fold that goes through the vertex of the angle. The angle has been successfully divided into two equal parts.

Let's TRY one more...



7.2 - Angle Bisectors and Parallel Lines

Students at the Hungry Heart Café learn how to work in a restaurant kitchen from chef Kathy Jaeger.

MATH *ON THE JOB*

The Hungry Heart Café is a unique restaurant in St. John's, Newfoundland. Founded by Stelle Burry Community Services, the Hungry Heart Café is both a restaurant and a job-training program for people who have experienced significant personal troubles including abuse, addictions, violence, and incarceration.

Chef Kathy Jaeger was instrumental in creating the Hungry Heart Café program. As a teacher, she gives her students classroom work, on the job training, and life skills development. "My main duties include instructing students in all aspects of introductory restaurant cooking and catering in hopes that it will improve their prospects for employment. I am also responsible for overall food production of the Café and staff supervision."

Originally from Ontario, but with family ties to the Maritimes, Kathy received her culinary training at George Brown College in Toronto, has her national certification in Food Safety Training from the Canadian Restaurant and Food Service Association, and her Red Seal certification. She uses math to calculate food, beverage, and labour costs; to measure ingredients using volume and weight measures; to order supplies and calculate menu pricing; to cut and slice foods proportionately; to calculate and track inventory; and to calculate conversions between imperial and SI units.

The Hungry Heart Café has been asked to cater a fundraising dinner, featuring apple pie for dessert.

1. If there are 60 guests, and Kathy bakes 10 pies, how many slices of pie will Kathy need to cut out of each pie to make sure there is a piece of pie for each guest?
2. What will be the approximate size of the central angles of the pieces of pie?
3. One of the guests wants only half a piece of pie. What would be the approximate size of the central angle of the half-piece of pie?

Solutions...

1. To calculate how many pieces of pie there will be in each pie, students will need to divide the number of guests by the number of pies.

   $60 \div 10 = 6$ pieces of pie

2. One pie is equal to 360°. Divide by the number of pieces.

   $360° \div 6 = 60°$

   The central angles of the pieces of pie will each be 60°.

3. Divide the size of the angle of a full slice by 2.

   $60° \div 2 = 30°$

   The central angles of the children's pie pieces will be 30°.

HOMEWORK...

- Do Activity 7.4 on p. 290
- Build Your Skills #1 - 6 on p. 292

7.2 - Build Your Skills Detailed Solutions.pdf

PRACTICE THE 3 CONSTRUCTIONS...

(done with a straight edge and compass)

1) Perpendicular Bisector

2) Angle Replication

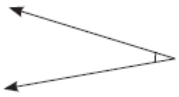
3) Bisect an Angle

QUIZ on these for Wednesday!!!

1. Luisa is a tile setter who works in Alberton, PEI. She is installing some tile in a room at the West Prince campus of Holland College. When installing tile, Luisa has to cut pieces of tile to fit the surface she is covering. Below are shown the angles of some pieces of tile that Luisa must cut.

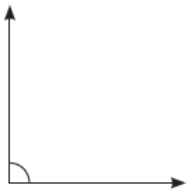
   For each of these angles, measure the angle. Then determine the measure of the resulting angles after each of the original angles has been bisected.

a)

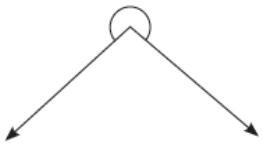


b)

c)



d)

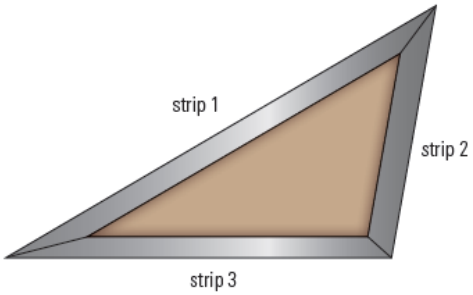


2. Jung Min has worked as a sheet metal worker for over 10 years. He has been hired to install work tables in the kitchen of the Charles S. Curtis Memorial Hospital, NL. These work tables need stainless steel edging bolted to their edges in order to reduce wear. Below is a scale (1:10) drawing of the stainless steel edging Jung Min will bolt over the top edges of one table. The edging has three mitred joints.

   a) Measure each angle.

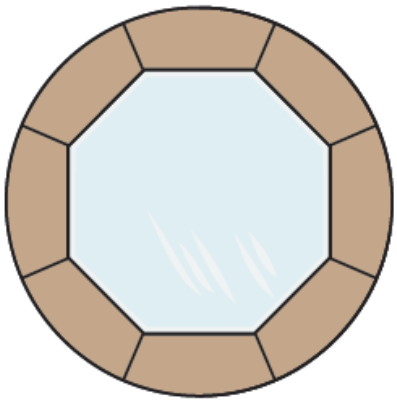
   b) Determine the measure of the bisector of each angle.

   c) Determine at what angle each end of each strip should be cut.

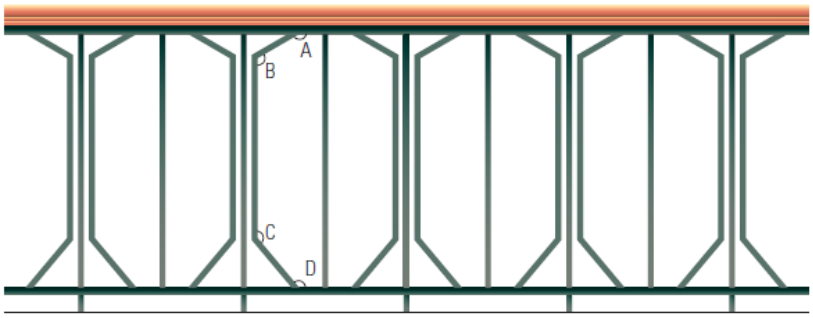


3. Imagine that you are a furniture-maker and have been asked to build a wood and glass tabletop according to the design shown here. Your client wants the outside to be made of wood, with an octagonal piece of glass in the centre. The tabletop is to be made of eight identical pieces of wood that have an arc on the outside edge, a straight side on the inside edge, and angled ends.

   The pieces of wood have to be cut so that their ends form mitre joints. If the mitre joints bisect the reflex angles outside of the octagon, at what angle relative to the straight sides of the wood must the ends be cut?

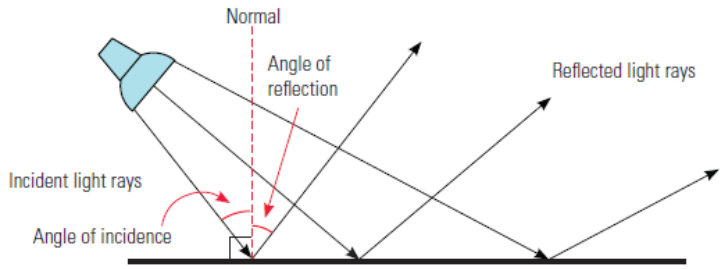


4. Jurek is a welder working on the construction of a pedestrian bridge in Kedgwick, New Brunswick. He is welding together the bridge railing. As a decorative element, Jurek is welding metal strips on each post as shown below. Determine the measure of each angle bisector for angles A, B, C, and D.

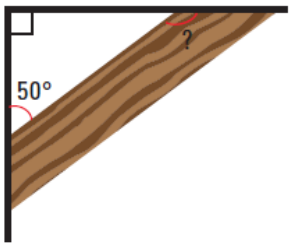


5. When a ray of light is reflected from a flat surface, the light strikes the surface at an angle (the angle of incidence) that is equal to the angle of reflection. Both of these angles are measured from a line that is perpendicular to the surface (called the normal).

   Using the diagram below, measure the total angle between each pair of incident and reflected rays in the left, middle, and right rays. Then determine the angles of incidence and reflection for each ray.



6. A carpenter needs to cut a 2-by-4 piece of wood that will fit in a corner, as shown in the diagram below. If one end of the wood forms a 50° angle with one wall, at what angle must the other end be cut (at the indicated angle) to lay flat against the other wall? Why must that end be cut to that measure?



Attachments

7.2 - Build Your Skills Solutions.pdf