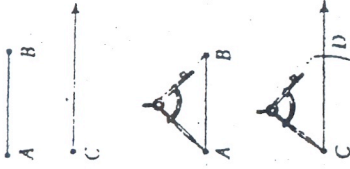## Construction 1
Congruent Segments

Construct a segment congruent to a given segment.

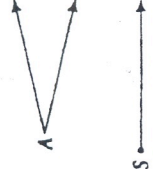Given: $\overline{AB}$

Step 1
Draw a ray with endpoint C.

Step 2
Open the compass to the length of $\overline{AB}$.

Step 3
With the same compass setting, put the compass point on C. Draw an arc that intersects the ray. Label the point of intersection D.
$\overline{CD} \cong \overline{AB}$

Construction 2
Congruent Angles

Construct an angle congruent to a given angle.

Given: $\angle A$

Step 1
Draw a ray with endpoint S.

Step 2
With the compass point on point A, draw an arc that intersects the sides of $\angle A$. Label the points of intersection B and C.

Step 3
With the same compass setting, put the compass point on point S. Draw an arc that intersects the ray at point R.
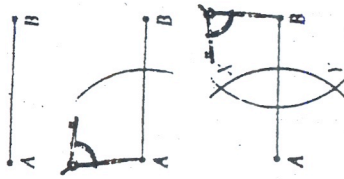
Step 4
Open the compass to the length of $\overline{BC}$. Keeping the same compass setting, put the compass point on R. Draw an arc to determine point T.

Step 5
Draw $\overrightarrow{ST}$.
$\angle S \cong \angle A$

Construction 3
Perpendicular Bisector

Construct the perpendicular bisector of a segment.

Given: $\overline{AB}$

Step 1
Put the compass point on point A and draw an arc. Be sure the opening is greater than $\frac{1}{2}$ AB. Keep the same compass setting for Step 2.

Step 2
Put the compass point on point B and draw an arc. Label the points where the two arcs intersect as X and Y.
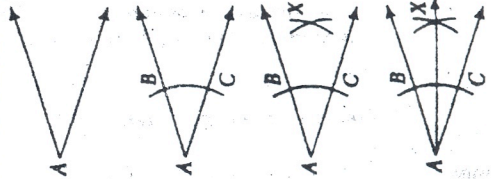
Step 3
Draw $\overleftrightarrow{XY}$. Label the intersection of $\overline{AB}$ and $\overleftrightarrow{XY}$ as point M.

$\overleftrightarrow{XY}$ is the perpendicular bisector of $\overline{AB}$. Point M is the midpoint of $\overline{AB}$.

You can use Construction 3 to divide any segment into fourths or eighths.

Construction 4
Angle Bisector

Construct the bisector of an angle.

Given: $\angle A$

Step 1
Put the compass point on vertex A. Draw an arc that intersects the sides of $\angle A$. Label the points of intersection B and C.

Step 2
Put the compass point on point C and draw an arc. Keep the same compass setting and repeat with point B. Be sure the arcs intersect. Label the point where the two arcs intersect as point X.

Step 3
Draw $\overrightarrow{AX}$.

$\overrightarrow{AX}$ is the angle bisector of $\angle CAB$.

CONSTRUCTIONS

Perpendicular lines intersect to form *four right angles.*

You can use a compass and a straightedge to construct a line perpendicular to a given line through a point on the line, *or* through a point *not* on the line.
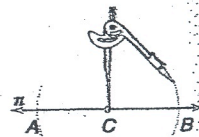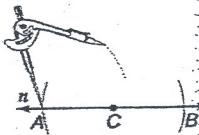
**Perpendicular Lines
Through a Point
on the Line**

Construct a line perpendicular to line n and passing through point C on n.

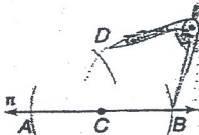1. Place the compass at point C. Using the same compass setting, draw arcs to the right and left of C, intersecting line n. Label the points of intersection A and B.

2. Open the compass to a setting greater than AC. Put the compass at point A and draw an arc above line n.

3. Using the same compass setting as in Step 2, place the compass at point B and draw an arc intersecting the arc previously drawn. Label the point of intersection D.

4. Use a straightedge to draw $\overline{CD}$.
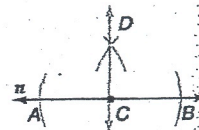
Conclusion: By construction, $\overline{CD}$ is perpendicular to n at C.

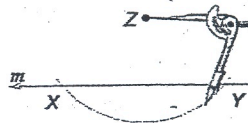**Perpendicular Lines
Through a Point
Not on the Line**
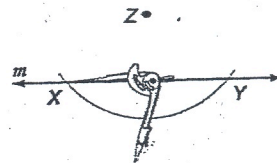
Construct a line perpendicular to line m and passing through point Z not on m.

1. Place the compass at point Z. Draw an arc that intersects line m in two different places. Label the points of intersection X and Y.
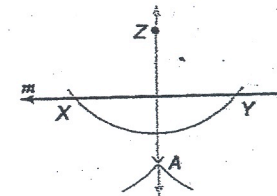
2. Open the compass to a setting greater than $\frac{1}{2}XY$. Put the compass at point X and draw an arc below line m.

3. Using the same compass setting, place the compass at point Y and draw an arc intersecting the arc drawn in Step 2. Label the point of intersection A.
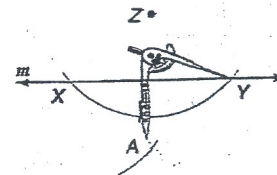
4. Use a straightedge to draw $\overline{ZA}$.

Conclusion: By construction, $\overline{ZA}$ is perpendicular to m.

Construction Title: *Constructing a segment congruent to a given segment*

Given Segments:

A •————————————————————• B   C •————————• D   E •————————• F

Directions: Use the given to construct $\overline{PQ}$ so that it is equal in length to the indicated lengths.
     Remember: keep all compass marks (that is part of the grade!)

1. PQ = AB

• P

2. PQ = 2AB

• P

3. PQ = AB + CD

• P

4. PQ = AB - CD

• P

5. PQ = 2EF + CD

6. PQ = 2AB - EF

7. PQ = 4CD

8. PQ = 3EF - CD

9. PQ = 5EF

10. PQ = 6EF - 2CD

11. PQ = 2(AB - EF)

Construction Sheet 2

Name _____ Block ____

Construction Title: Constructing the perpendicular bisector of a given segment

Directions: Use your compass and straight edge to construct each.
Remember: keep all compass marks – use right angle box and congruent marks on each construction

Construct:

1. $\overleftrightarrow{XY}$ as the perpendicular bisector of $\overline{AB}$

A

B
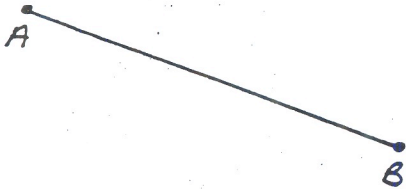
2. $\overrightarrow{AB}$ bisecting $\overline{CD}$ at M

C

D

3. $\overline{CD}$ as the perpendicular bisector of $\overline{AB}$

B

A
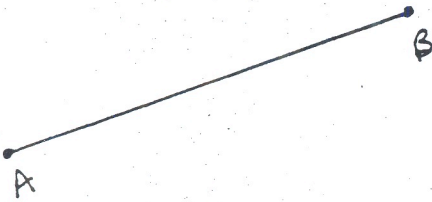
4. The bisector of $\overline{CD}$ so that M is its midpoint.

C

D
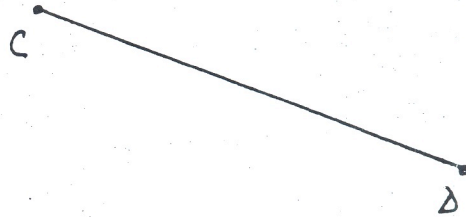
More Practice: Construct $\overleftrightarrow{XY}$ as the perpendicular bisector of $\overline{CD}$

C

D

6)

C

D

7)

C

D

9)

C

D

10)

C

D
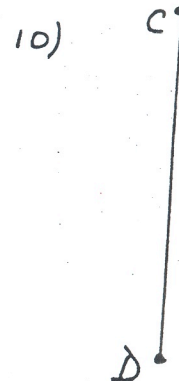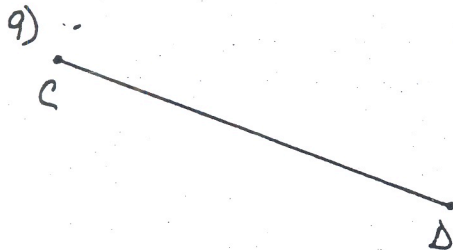
#10 (turn the paper sideways)

DSS

Constructing Perpendiculars   Name _____
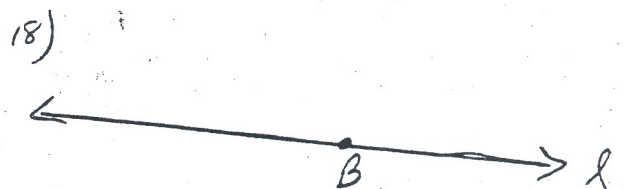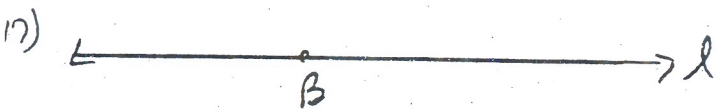
Construct a perpendicular line from point B to ℓ

1)

• B

←——————————————→ ℓ

2)

• B

←——————————————→ ℓ

3)

←——————————————→ ℓ

• B

4)

←——————————————→ ℓ

• B

Construct a perpendicular line through point B on line ℓ

5)

←———————B.———————→ ℓ

6)

←——————————B——————→ ℓ

7)

←———B—————————————→ ℓ

8)

←——————————B————————→ ℓ

D49   Constructing Perpendiculars   Name _____

Construct a perpendicular line from point B to ℓ

12)

11)

ℓ

• B

• B

ℓ

13)

• B

ℓ

14)

ℓ

• B

Construct a perpendicular line through point B on line ℓ
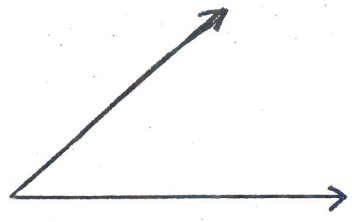
15)

B

ℓ

16)

B

ℓ
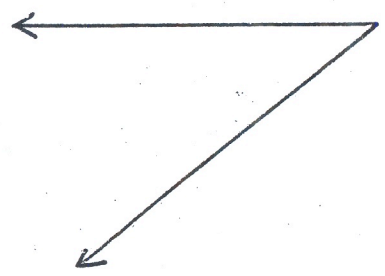
17)

B

ℓ
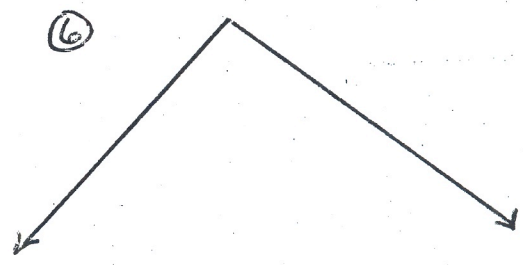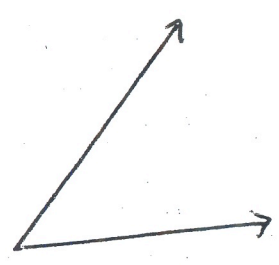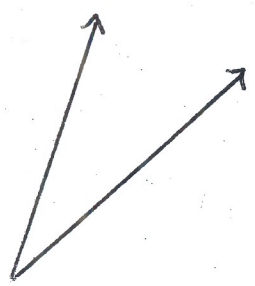
18)

B
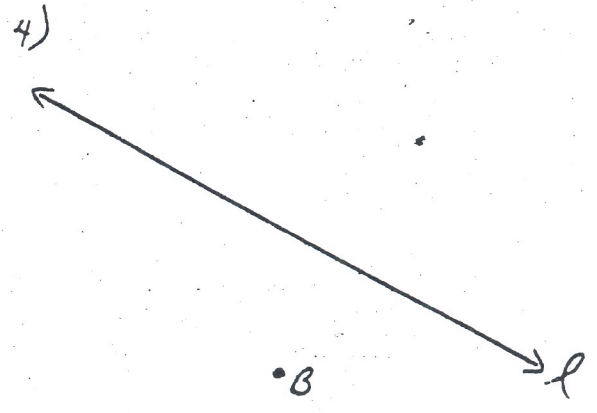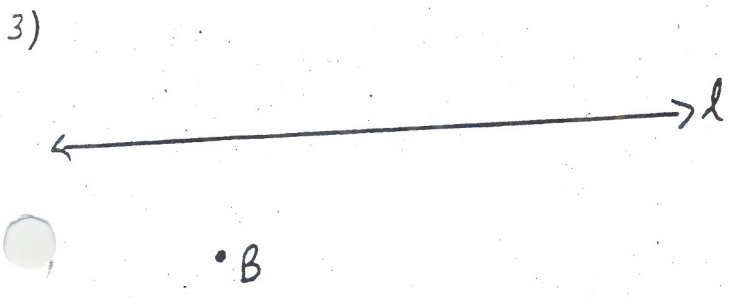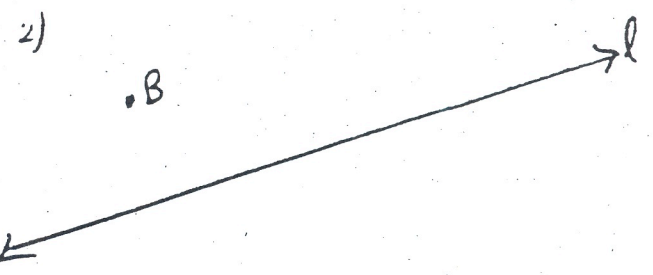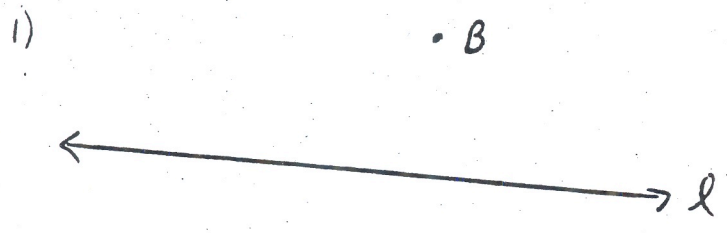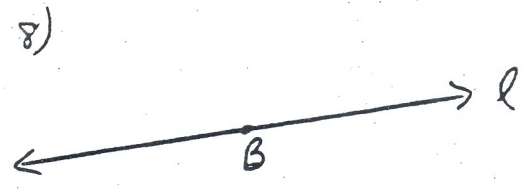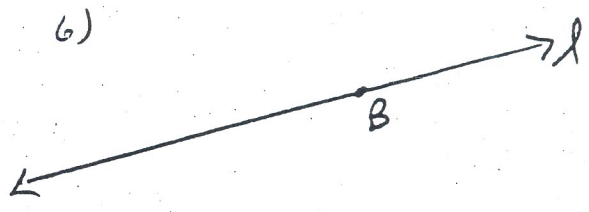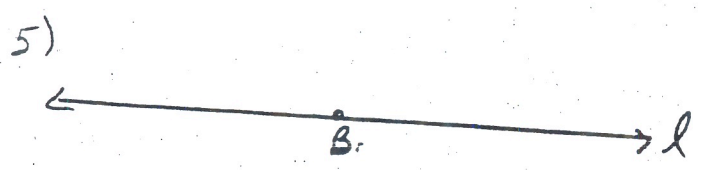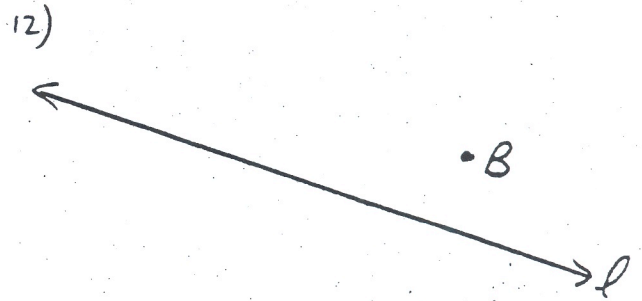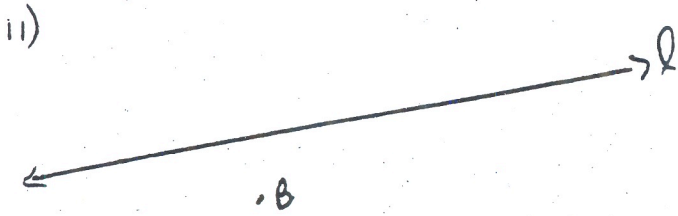
ℓ

Construct the bisector of an angle.
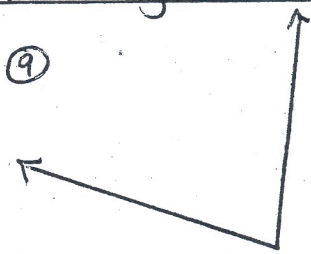
①
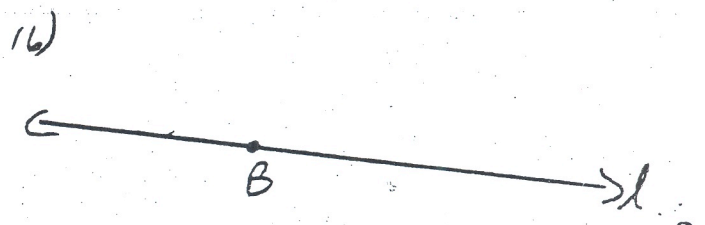
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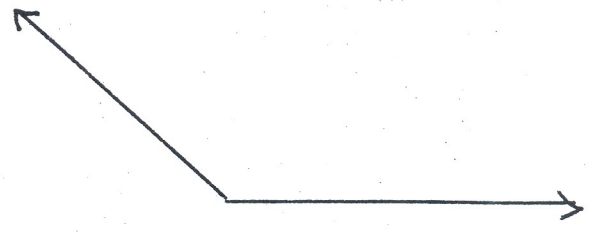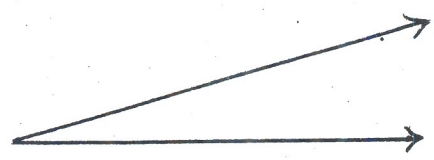
③

④
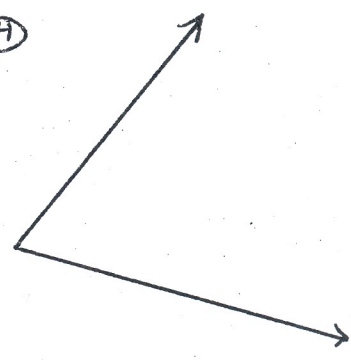
⑤

⑥

Construct an angle congruent to a given angle

⑦

⑧

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⑩