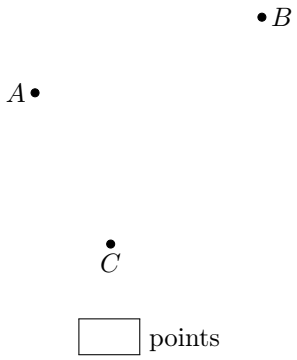
ELEMENTS OF GEOMETRY

A POINT

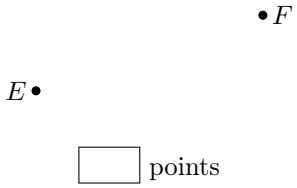
A.1 COUNTING NUMBER OF POINTS

Ex 1: Count the points in the figure.



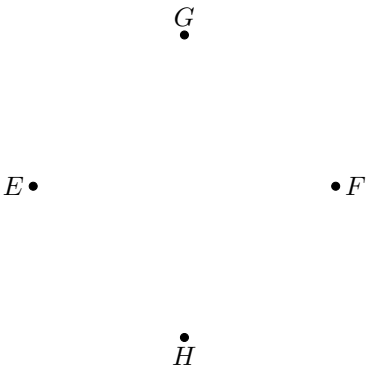
☐ points

Ex 2: Count the points in the figure.



☐ points

Ex 3: Count the points in the figure.



☐ points

Ex 4: Count the points in the figure.

☐ point

A.2 DRAWING POINTS

Ex 5: Using a pencil, draw a point and label it A.

Ex 6: Using a pencil, draw two points and label them A and B.

Ex 7: Using a pencil, draw three points and label them A, B, and C.

B LINES, SEGMENTS AND RAYS

B.1 RECOGNIZING

MCQ 8: Which term describes this figure?

Choose one answer:

- ☐ Line
- ☐ Line segment
- ☐ Ray

MCQ 9: Which term describes this figure?

Choose one answer:

- ☐ Line
- ☐ Line segment
- ☐ Ray

MCQ 10: Which term describes this figure?

Choose one answer:

- ☐ Line
- ☐ Line segment
- ☐ Ray

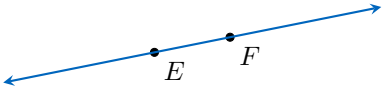
MCQ 11: Which term describes this figure?

Choose one answer:

- ☐ Line
- ☐ Line segment
- ☐ Ray

B.2 NAMING

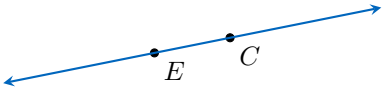
MCQ 12: Name the line represented in this figure:



Choose one answer:

- ☐ $\overline{EF}$
- ☐ $\overleftrightarrow{EF}$
- ☐ $\overrightarrow{EF}$

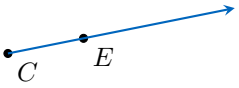
MCQ 13: Name the line represented in this figure:



Choose one answer:

- ☐ $\overline{CE}$
- ☐ $\overleftrightarrow{CE}$
- ☐ $\overrightarrow{CE}$

MCQ 14: Name the ray represented in this figure:



Choose one answer:

- ☐ $\overline{CE}$
- ☐ $\overleftrightarrow{CE}$
- ☐ $\overrightarrow{CE}$
- ☐ $\overrightarrow{EC}$

MCQ 15: Name the ray represented in this figure:

Choose one answer:

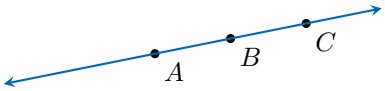
- ☐ $\overline{EC}$
- ☐ $\overleftrightarrow{EC}$
- ☐ $\overrightarrow{CE}$
- ☐ $\overrightarrow{EC}$

MCQ 16: Name the segment represented in this figure:

Choose one answer:

- ☐ $\overline{EC}$
- ☐ $\overleftrightarrow{EC}$
- ☐ $\overrightarrow{EC}$

MCQ 17: Name the line represented in this figure:



Choose all correct answers:

- ☐ $\overleftrightarrow{AB}$
- ☐ $\overleftrightarrow{AC}$
- ☐ $\overleftrightarrow{BC}$

B.3 DRAWING LINES, SEGMENTS AND RAYS

Ex 18: Using a ruler and pencil, draw a straight line passing through points A and B. Label both points clearly.

Ex 19: Using a ruler and pencil, draw a line segment passing through points A and B. Label both points clearly.

Ex 20: Using a ruler and pencil, draw a ray passing through points A and B. Label both points clearly.

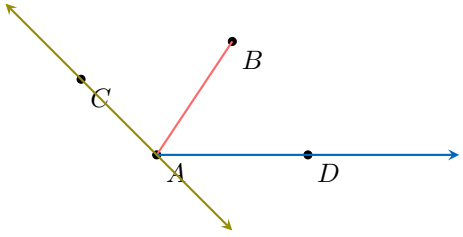
B.4 CHECKING A CONSTRUCTION PROGRAM

MCQ 21: A teacher gives these construction steps:

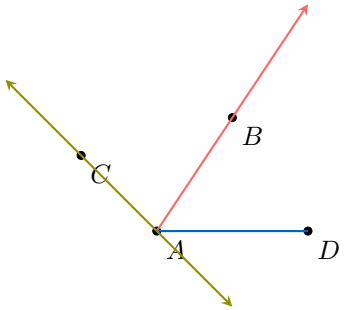
1. Draw points A, B, C, and D
2. Draw segment $\overline{AB}$
3. Draw line $\overleftrightarrow{AC}$
4. Draw ray $\overrightarrow{AD}$

Which student followed the instructions correctly?**Select the correct answer:**

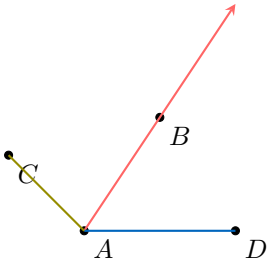
- ☐ Hugo



☐ Louis



☐ Vincent

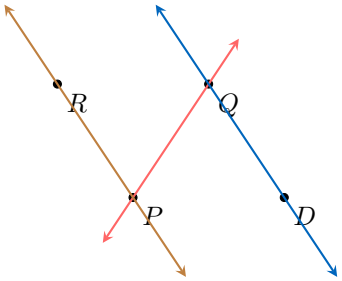


MCQ 22: A teacher gives these construction steps:

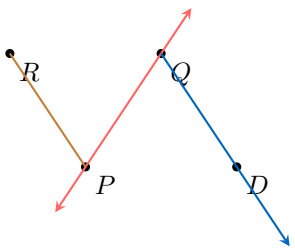
1. Draw points P, Q, R, and D
2. Draw segment $\overline{PR}$
3. Draw line $\overleftrightarrow{PQ}$
4. Draw ray $\overrightarrow{QD}$

Which student followed the instructions correctly?**Select the correct answer:**

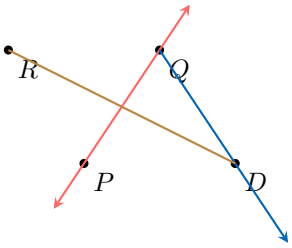
☐ Hugo



☐ Louis



☐ Vincent

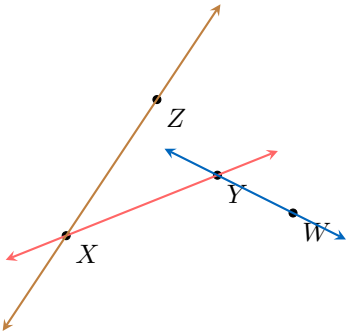


MCQ 23: A teacher gives these construction steps:

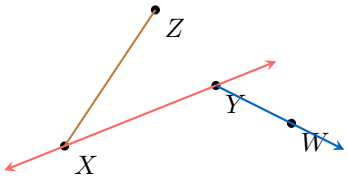
1. Draw points X, Y, Z, and W
2. Draw segment $\overline{XZ}$
3. Draw line $\overleftrightarrow{XY}$
4. Draw ray $\overrightarrow{YW}$

Which student followed the instructions correctly?**Select the correct answer:**

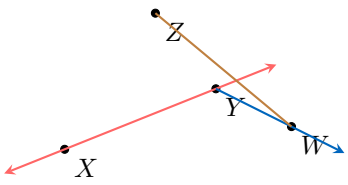
☐ Hugo



☐ Louis



☐ Vincent



B.5 BUILDING GEOMETRIC FIGURES

Ex 24: Using a ruler and pencil, draw three points A, B, and C, and the straight line $\overleftrightarrow{AB}$.

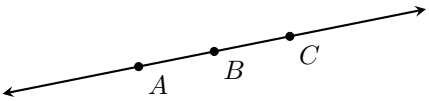
Ex 25: Using a ruler and pencil, draw three points A, B, and C, and the line segment $\overline{AC}$.

Ex 26: Using a ruler and pencil, draw three points A, B, and C, and the line segments $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$.

C ELEMENT RELATION

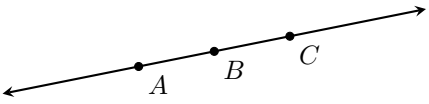
C.1 IDENTIFYING POINTS ON GEOMETRIC FIGURES

Ex 27: Does point C lie on the line through points A and B?



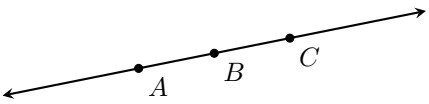
C $\square \in$ / $\square \notin$ $\overleftrightarrow{AB}$

Ex 28: Does point C lie on the ray from A through B?



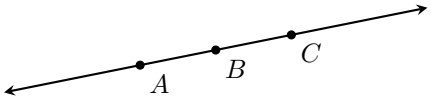
C $\square \in$ / $\square \notin$ $\overrightarrow{AB}$

Ex 29: Does point C lie on the ray from B through A?



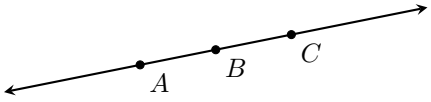
C $\square \in$ / $\square \notin$ $\overrightarrow{BA}$

Ex 30: Does point C lie on the line segment between B and A?



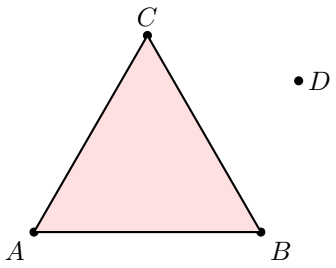
C $\square \in$ / $\square \notin$ $\overline{BA}$

Ex 31: Does point B lie on the line segment between A and C?



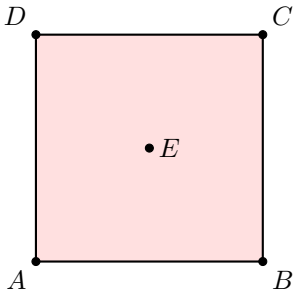
B $\square \in$ / $\square \notin$ $\overline{AC}$

Ex 32: Does point D lie on triangle ABC?



D $\square \in$ / $\square \notin$ $\triangle ABC$

Ex 33: Does point E lie on square $ABCD$?

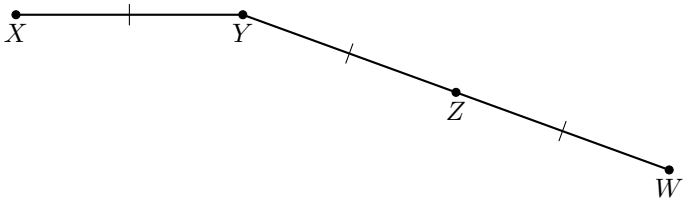


E $\square \in$ / $\square \notin$ $\square ABCD$

D LENGTH

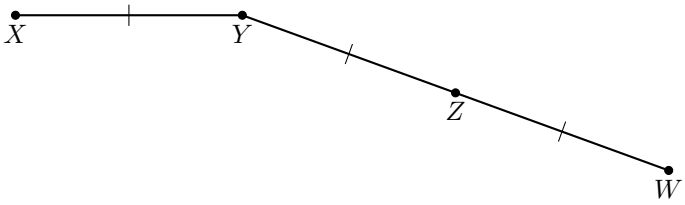
D.1 USING TICK MARKS TO CALCULATE LENGTHS

Ex 34: The segment $\overline{XY}$ measures 3 cm. Use the tick marks to find the length of segment $\overline{YZ}$.



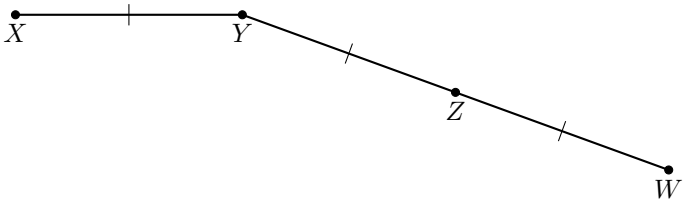
$YZ =$ ☐ cm

Ex 35: The segment $\overline{XY}$ measures 3 cm. Use the tick marks to find the length of segment $\overline{ZW}$.



$ZW =$ ☐ cm

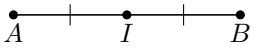
Ex 36: The segment $\overline{XY}$ measures 3 cm. Use the tick marks to find the length of segment $\overline{YW}$.



$YW =$ ☐ cm

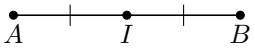
D.2 CALCULATE LENGTHS USING A MIDPOINT

Ex 37: The segment $\overline{AI}$ measures 3 cm. Use the tick marks to find the length of segment $\overline{AB}$.



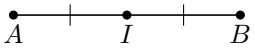
$AB =$ ☐ cm

Ex 38: The segment $\overline{IB}$ measures 10 cm. Use the tick marks to find the length of segment $\overline{AB}$.



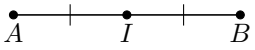
$AB =$ ☐ cm

Ex 39: The segment $\overline{AB}$ measures 10 cm. Use the tick marks to find the length of segment $\overline{AI}$.



$AI =$ ☐ cm

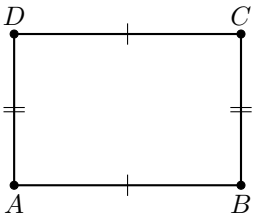
Ex 40: The segment $\overline{AB}$ measures 20 cm. Use the tick marks to find the length of segment $\overline{AI}$.



$AI =$ ☐ cm

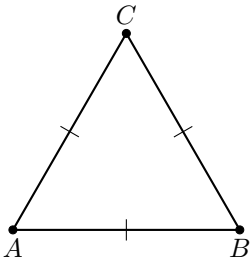
D.3 USING TICK MARKS TO FIND PERIMETER

Ex 41: The segment $\overline{AB}$ measures 3 cm and segment $\overline{BC}$ measures 2 cm. Use the tick marks to find the perimeter of rectangle $ABCD$.



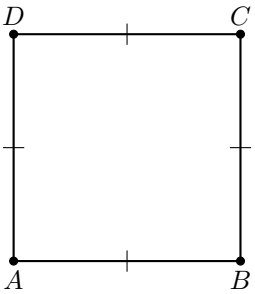
Perimeter of the rectangle $ABCD =$ ☐ cm

Ex 42: The segment $\overline{AB}$ measures 3 cm. Use the tick marks to find the perimeter of triangle ABC.



Perimeter of $\triangle ABC =$ ☐ cm

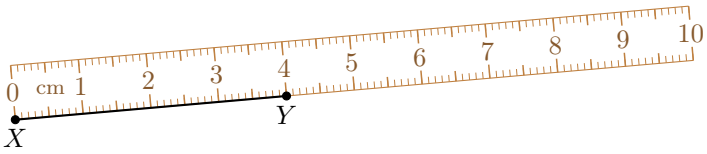
Ex 43: The segment $\overline{AB}$ measures 3 cm. Use the tick marks to find the perimeter of square $ABCD$.



Perimeter of $\square ABCD =$ ☐ cm

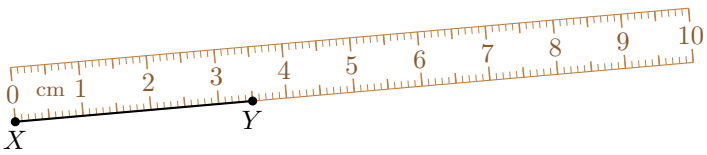
D.4 MEASURING WITH A RULER

Ex 44: Measure the length of segment $\overline{XY}$ using the ruler shown.



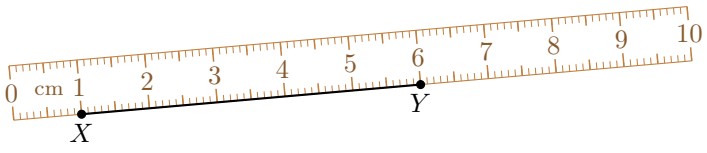
$XY =$ ☐ cm

Ex 45: Measure the length of segment $\overline{XY}$ using the ruler shown.



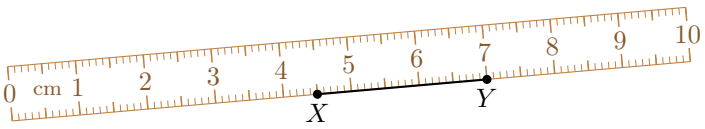
$XY =$ ☐ cm

Ex 46: Measure the length of segment $\overline{XY}$ using the ruler shown.



$XY =$ ☐ cm

Ex 47: Measure the length of segment $\overline{XY}$ using the ruler shown.

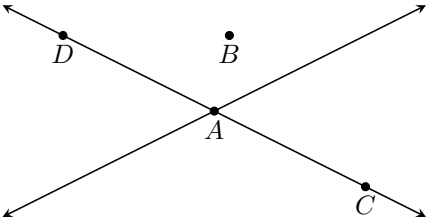


$XY =$ ☐ cm

E INTERSECTION POINT

E.1 PICKING THE INTERSECTION POINTS

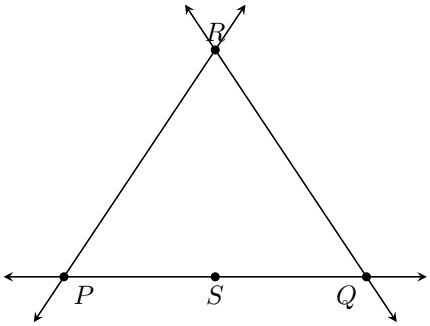
MCQ 48: Pick the point where the lines intersect.



Choose one point:

- ☐ A
- ☐ B
- ☐ C
- ☐ D

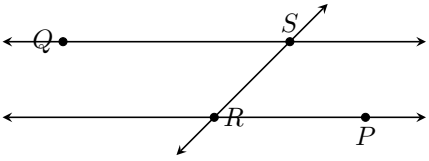
MCQ 49: Pick the points where the lines intersect.



Choose all correct points:

- ☐ P
- ☐ Q
- ☐ R
- ☐ S

MCQ 50: Pick the points where the lines intersect.



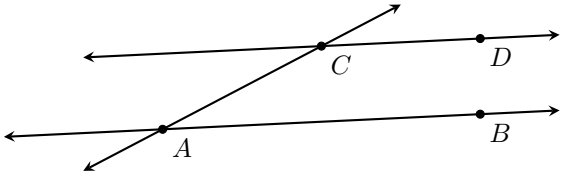
Choose all correct points:

- ☐ P
- ☐ Q
- ☐ R
- ☐ S

F PARALLEL LINES

F.1 IDENTIFYING PARALLEL LINES

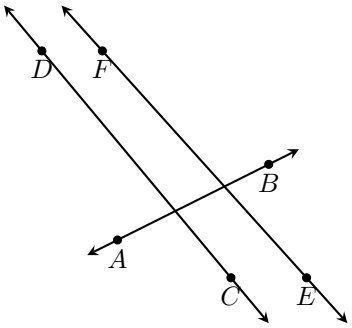
MCQ 51:



Choose the true statement:

- ☐ $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{AC}$.
- ☐ $\overleftrightarrow{CD}$ is parallel to $\overleftrightarrow{AC}$.
- ☐ $\overleftrightarrow{CD}$ is parallel to $\overleftrightarrow{AB}$.

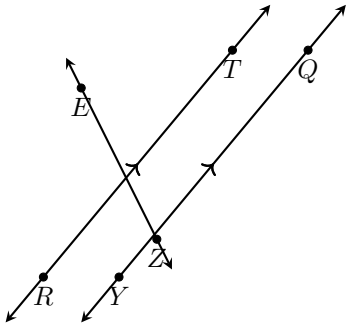
MCQ 52:



Choose the true statement:

- ☐ $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{DC}$.
- ☐ $\overleftrightarrow{DC}$ is parallel to $\overleftrightarrow{FE}$.
- ☐ $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{FE}$.

MCQ 53:

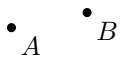


Choose the true statement:

- ☐ $\overleftrightarrow{ZE}$ is parallel to $\overleftrightarrow{RT}$.
- ☐ $\overleftrightarrow{ZE}$ is parallel to $\overleftrightarrow{YQ}$.
- ☐ $\overleftrightarrow{RT}$ is parallel to $\overleftrightarrow{YQ}$.

F.2 COUNTING POSSIBLE LINES

MCQ 54: Can you find a line that passes through points A and B ? How many such lines are possible?

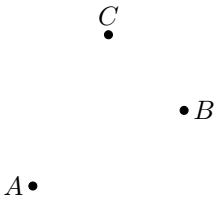


☐ 0

☐ 1

☐ Infinite

MCQ 55: Can you find a line that passes through points A, B, and C together? How many such lines are possible?



☐ 0

☐ 1

☐ Infinite

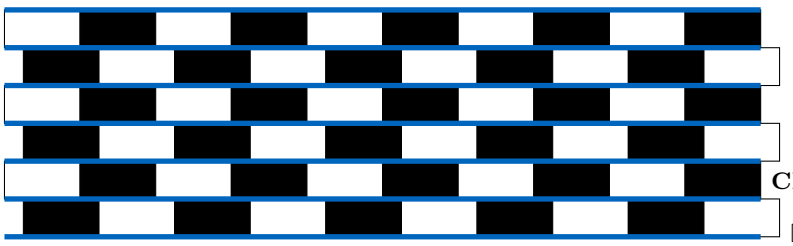
MCQ 56: Can you find a line that passes through point A? How many such lines are possible?

☐ 0

☐ 1

☐ Infinite

MCQ 57: Are the blue thick lines parallel?



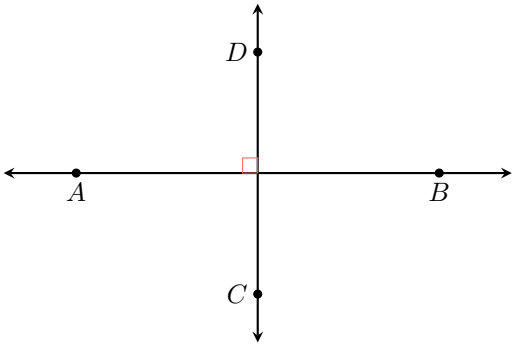
☐ Yes

☐ No

G PERPENDICULAR LINES

G.1 IDENTIFYING PERPENDICULAR LINES

MCQ 58:



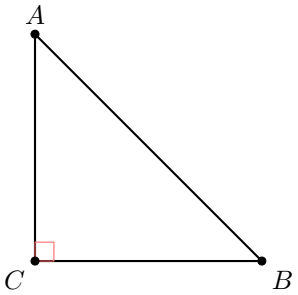
Choose the true statement:

☐ $\overleftrightarrow{CD}$ is parallel to $\overleftrightarrow{AB}$.

☐ $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$.

☐ $\overleftrightarrow{CD}$ is perpendicular to $\overleftrightarrow{AB}$.

MCQ 59:



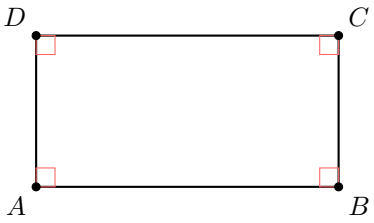
Choose the true statement:

☐ $\overleftrightarrow{AB}$ is perpendicular to $\overleftrightarrow{AC}$.

☐ $\overleftrightarrow{AB}$ is perpendicular to $\overleftrightarrow{BC}$.

☐ $\overleftrightarrow{AC}$ is perpendicular to $\overleftrightarrow{BC}$.

MCQ 60:



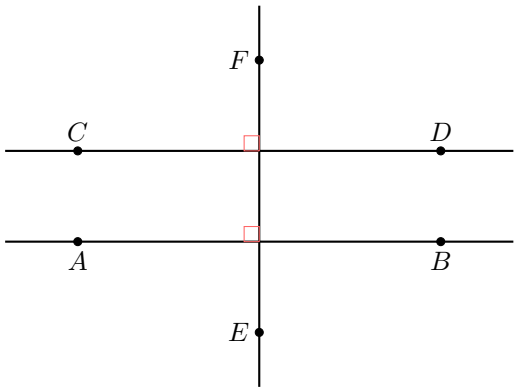
Choose all true statements:

☐ $\overleftrightarrow{AB}$ is perpendicular to $\overleftrightarrow{AD}$.

☐ $\overleftrightarrow{AB}$ is perpendicular to $\overleftrightarrow{BC}$.

☐ $\overleftrightarrow{BC}$ is perpendicular to $\overleftrightarrow{CD}$.

MCQ 61:



Choose the true statements:

☐ $\overleftrightarrow{CD}$ is perpendicular to $\overleftrightarrow{AB}$.

☐ $\overleftrightarrow{EF}$ is perpendicular to $\overleftrightarrow{CD}$.

☐ $\overleftrightarrow{EF}$ is perpendicular to $\overleftrightarrow{AB}$.

G.2 BUILDING GEOMETRIC FIGURES

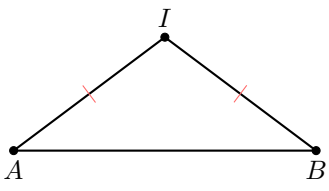
Ex 62: Using a ruler, pencil, and set square, draw line $\overleftrightarrow{AB}$ and a perpendicular line through a point P on $\overleftrightarrow{AB}$.

Ex 63: Using a ruler, pencil, and set square, draw two parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, and a line perpendicular to $\overleftrightarrow{AB}$ through a point P on $\overleftrightarrow{AB}$.

H MIDPOINT AND PERPENDICULAR BISECTOR

H.1 IDENTIFYING MIDPOINTS AND PERPENDICULAR BISECTORS

MCQ 64: Point I is the midpoint of segment $\overline{AB}$.

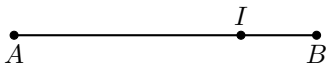


Is the statement true or false?

☐ True

☐ False

MCQ 65: Point I is the midpoint of segment $\overline{AB}$.

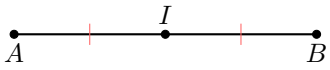


Is the statement true or false?

☐ True

☐ False

MCQ 66: Point I is the midpoint of segment $\overline{AB}$.

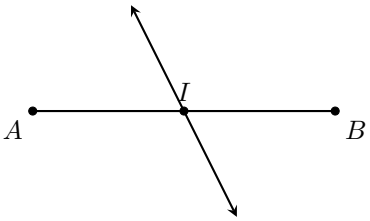


Is the statement true or false?

☐ True

☐ False

MCQ 67: Line $\overleftrightarrow{EF}$ is the perpendicular bisector of segment $\overline{AB}$.

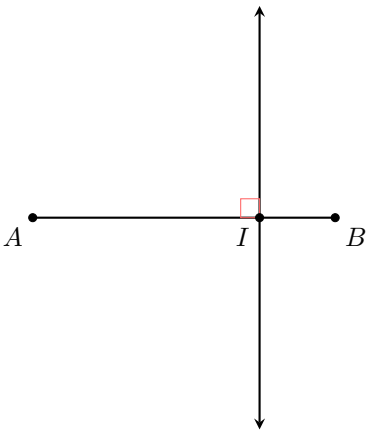


Is the statement true or false?

☐ True

☐ False

MCQ 68: Line $\overleftrightarrow{EF}$ is the perpendicular bisector of segment $\overline{AB}$.

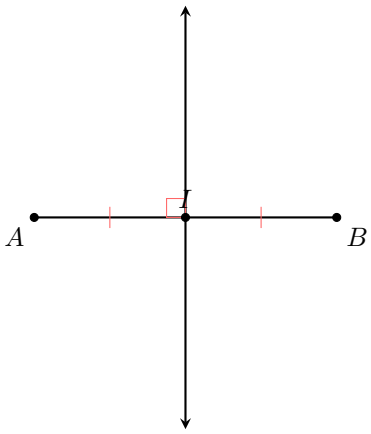


Is the statement true or false?

☐ True

☐ False

MCQ 69: Line $\overleftrightarrow{EF}$ is the perpendicular bisector of segment $\overline{AB}$.



Is the statement true or false?

☐ True

☐ False

H.2 BUILDING GEOMETRIC FIGURES

Ex 70: Using a ruler and pencil, draw segment $\overline{AB}$ and its midpoint I.

Ex 71: Using a ruler and pencil, draw segment $\overline{AB}$, its midpoint I, and the perpendicular bisector of $\overline{AB}$.

Ex 72: Using a ruler, compass, and pencil, draw triangle ABC and construct the perpendicular bisectors of its three sides $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$ following the method for constructing a perpendicular bisector. Observe where the perpendicular bisectors intersect.

I PROPERTIES OF PARALLEL LINES

I.1 INVESTIGATING LINE RELATIONSHIPS

MCQ 73: Given that $\overleftrightarrow{l_1}$ is perpendicular to $\overleftrightarrow{l_3}$ and $\overleftrightarrow{l_2}$ is perpendicular to $\overleftrightarrow{l_3}$, what is the relationship between $\overleftrightarrow{l_1}$ and $\overleftrightarrow{l_2}$?

☐ Parallel

☐ Perpendicular

MCQ 74: Given that $\overleftrightarrow{l_1}$ is perpendicular to $\overleftrightarrow{l_3}$ and $\overleftrightarrow{l_1}$ is parallel to $\overleftrightarrow{l_2}$, what is the relationship between $\overleftrightarrow{l_2}$ and $\overleftrightarrow{l_3}$?

☐ Perpendicular

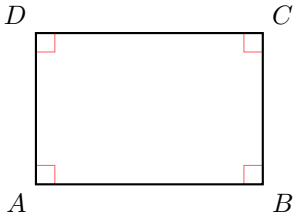
☐ Parallel

MCQ 75: Given that $\overleftrightarrow{l_1}$ is parallel to $\overleftrightarrow{l_2}$ and $\overleftrightarrow{l_2}$ is parallel to $\overleftrightarrow{l_3}$, what is the relationship between $\overleftrightarrow{l_1}$ and $\overleftrightarrow{l_3}$?

☐ Parallel

☐ Perpendicular

MCQ 76:



Which student correctly explains why $\overleftrightarrow{AB}$ and $\overleftrightarrow{DC}$ are parallel in rectangle $ABCD$?

☐ Su: "I see that $\overleftrightarrow{AB}$ and $\overleftrightarrow{DC}$ are parallel."

☐ Louis: "Since $\overleftrightarrow{AB}$ and $\overleftrightarrow{AD}$ are perpendicular and $\overleftrightarrow{DC}$ and $\overleftrightarrow{AD}$ are perpendicular, $\overleftrightarrow{AB}$ and $\overleftrightarrow{DC}$ are parallel."

☐ Hugo: "Since $\overleftrightarrow{AB}$ and $\overleftrightarrow{BC}$ are parallel and $\overleftrightarrow{DC}$ and $\overleftrightarrow{DA}$ are parallel, $\overleftrightarrow{AB}$ and $\overleftrightarrow{DC}$ are parallel."