LESSON MAKER PRO

Copy It Exactly

Plan precise segment and angle constructions.

HIGH SCHOOL · MA.912.GR.5.1

MA.912.GR.5.1 "Construct a copy of a segment or an angle."

NAME _____ DATE _____

MATCH THE MEASURE

Congruent segments have equal lengths, and congruent angles have equal measures. To copy a segment, keep the compass opening equal to the original length. To copy an angle, transfer the arc marks and the distance between the arc-intersection points.

WORKED EXAMPLE

Segment AB is 9 cm long. Describe how to construct a congruent segment starting at P on a ray.

1. Draw a ray with endpoint P.
2. Set the compass opening from A to B.
3. Place the compass point at P and mark where the arc crosses the ray.

Answer: The marked point Q makes PQ = 9 cm.

PRACTICE 5 problems

1 Segment QR is 6 cm long. Segment ST is a copy of QR. What is ST?

ANSWER _____

2 Angle A measures 42°. Angle B is a copy of angle A. What is m∠B?

ANSWER _____

3 You are copying segment MN onto ray PX. After setting the compass width to MN and placing the point at P, what do you draw?

ANSWER _____

4 An arc crosses both sides of an original angle. What distance must you transfer onto the new arc?

ANSWER _____

5 Segment CD is 13 mm long. Segment UV is constructed as a copy of CD. What is UV?

ANSWER _____

APPLY IT Show your work

1 A concert lighting crew needs a second cardboard guide with the same 65° opening as a guide on the plan. What angle measure must the second guide have, and what angle-construction distance is transferred?

WORK SPACE

ANSWER _____

2 A phone-stand designer copies an 18 mm segment from a template onto a new design. What length should the copied segment be, and what compass setting must be kept?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

An arc centered at J crosses the sides of an angle at K and L. An equal-radius arc centered at P crosses a new ray at Q. The distance KL is copied onto the new arc to locate R, and PR is drawn. Explain why ∠QPR is congruent to ∠KJL.

_____

_____

ANSWER KEY

Copy It Exactly

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Segment QR is 6 cm long. Segment ST is a copy of QR. What is ST?	**6 cm**
2	Angle A measures 42°. Angle B is a copy of angle A. What is m∠B?	**42°**
3	You are copying segment MN onto ray PX. After setting the compass width to MN and placing the point at P, what do you draw?	**An arc that crosses ray PX.**
4	An arc crosses both sides of an original angle. What distance must you transfer onto the new arc?	**The distance between the two original arc-intersection points.**
5	Segment CD is 13 mm long. Segment UV is constructed as a copy of CD. What is UV?	**13 mm**

PART 2 · APPLY IT

1. **65°; transfer the distance between the original arc-intersection points.** A copied angle is congruent to the original, so it has the same measure. The chord between the original arc marks is copied onto an equal-radius arc.
2. **18 mm; keep the compass opening equal to the original segment.** A copied segment must be congruent to the template segment. The compass opening preserves the original length.

CHALLENGE

JK = JL = PQ = PR because the arcs have equal radii, and KL = QR because that distance was copied. Therefore triangles JKL and PQR are congruent by SSS, so ∠KJL = ∠QPR.

Accept equivalent construction language, such as “mark the point where the arc meets the ray.” For the challenge, accept any correct SSS-based explanation that identifies equal radii and the copied chord.