

Congruent Triangles: math test solutions, Grade 10 – download the PDF

Test solutions with the detailed point scale. Add up your points and spot what to review.

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Angles of a triangle

/ 3 pts

- a. $6x + 30 = 180$ gives $x = 25$ (1 pt). The angles are 55° , 70° and 55° (1 pt).
- b. The exterior angle at C is $180 - 55 = 125^\circ$, which equals $m\angle A + m\angle B = 55 + 70$ (1 pt).

2 Which criterion?

/ 3 pts

- a. SAS: the angle at B is between sides AB and BC (1 pt).
- b. AAS: two angles and a side that is not between them (1 pt).
- c. Not enough: the angle at A is not between the sides AB and BC , so this is SSA (1 pt).

3 Hypotenuse-Leg

/ 3 pts

Both are right triangles with equal hypotenuses and one pair of equal legs:

$\triangle JKL \cong \triangle MNP$ by HL (2 pts).

$LK = \sqrt{25^2 - 7^2} = \sqrt{576} = 24$ in, and $PN = 24$ in by CPCTC; that is
 $24 \times 2.54 = 60.96$ cm (1 pt).

4 Isosceles triangle

/ 4 pts

a. Base angles are equal: $5y + 1 = 3y + 17$ (1 pt), so $y = 8$ and each base angle is 41° (1 pt).

b. $m\angle A = 180 - 41 - 41 = 98^\circ$ (2 pts).

5 Proof in a parallelogram

/ 4 pts

Compare $\triangle ABC$ and $\triangle CDA$.

$AB = CD$ (given) (1 pt). $\angle BAC = \angle DCA$, alternate interior angles for parallel lines AB and DC cut by $\overline{AC}$ (1 pt). $AC = CA$, shared side (1 pt).

So $\triangle ABC \cong \triangle CDA$ by SAS, and $BC = DA$ by CPCTC (1 pt).

6 Congruence by reflection

/ 3 pts

$RS^2 = 36 + 4 = 40$, $ST^2 = 16 + 9 = 25$, $RT^2 = 4 + 25 = 29$ (1 pt).

$R'S'^2 = 4 + 36 = 40$, $S'T'^2 = 9 + 16 = 25$, $R'T'^2 = 25 + 4 = 29$ (1 pt).

All three pairs of sides are equal, so $\triangle RST \cong \triangle R'S'T'$ by SSS (1 pt).



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