

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

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

1 Angles of a triangle

/ 3 pts

In $\triangle ABC$, $m\angle A = (2x + 5)^\circ$, $m\angle B = (3x - 5)^\circ$ and $m\angle C = (x + 30)^\circ$.

- Find x and the three angles.
- Side $\overline{AC}$ is extended past C . Find the exterior angle at C .

2 Which criterion?

/ 3 pts

For each pair of triangles $\triangle ABC$ and $\triangle DEF$, name the criterion that proves them congruent, or write “not enough”.

- $AB = DE$, $\angle B = \angle E$, $BC = EF$.
- $\angle A = \angle D$, $\angle B = \angle E$, $BC = EF$.
- $AB = DE$, $BC = EF$, $\angle A = \angle D$.

3 Hypotenuse-Leg

/ 3 pts

$\triangle JKL$ is right at K and $\triangle MNP$ is right at N . $JL = MP = 25$ in and $JK = MN = 7$ in. Prove the triangles are congruent and find LK and PN (in inches and centimeters).

4 Isosceles triangle

/ 4 pts

In isosceles $\triangle ABC$ with $AB = AC$, the base angles are $\angle B = (5y + 1)^\circ$ and $\angle C = (3y + 17)^\circ$.

- Find y and the base angles.
- Find the apex angle $\angle A$.

5 Proof in a parallelogram

/ 4 pts

In quadrilateral $ABCD$, $\overline{AB} \parallel \overline{DC}$ and $AB = DC$. Prove that $BC = DA$. *Hint: draw diagonal $\overline{AC}$.*

6 Congruence by reflection

/ 3 pts

Let $R(0, 0)$, $S(6, 2)$, $T(2, 5)$ and $R'(0, 0)$, $S'(2, 6)$, $T'(5, 2)$. The second triangle is the reflection of the first across the line $y = x$. Use squared distances to prove $\triangle RST \cong \triangle R'S'T'$.



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