

Math 5e, Homework 27

due May 7

Instructions: Some of the problems we solved in class, and some are new. Please try to solve all problems, do your best, and show your work. **Write on separate sheets of paper, not between the lines of this handout!**

Geometry: Congruency

Congruent triangles

Rule 1 (Side-Side-Side rule). If $AB = A'B'$, $BC = B'C'$ and $AC = A'C'$ then $\triangle ABC \cong \triangle A'B'C'$.

Rule 2 (Side-Angle-Side rule). If $AB \cong A'B'$, $AC \cong A'C'$ and the angles these sides $\angle CAB = \angle C'A'B'$, then $\triangle ABC \cong \triangle A'B'C'$.

Rule 3 (Axiom 1) ASA rule. The triangles $\triangle ABC \cong \triangle A'B'C'$ are congruent when two angles and the side between them are equal; $\angle CAB = \angle C'A'B'$, $AB = A'B'$, and $\angle ABC = \angle A'B'C'$

Parallelogram: A parallelogram is a quadrilateral in which opposite sides are parallel.

The sum of angles of an n-gon: is $(n - 2) \times 180$.

Homework

(We have solved some of these problems in class; review notes)

1. Solve the equations

(a) $3x + 3 = \frac{1}{2}x + 13$

(b) $|x + 2| = 7$

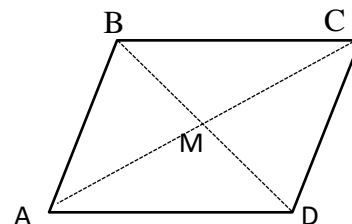
(c) $25 + x^2 = 89$

2. Draw a rectangle and label it as ABCD.

- (a) Explain why, in a rectangle, opposite sides are equal.
(b) Show (prove) that a diagonal (pick one) cuts the rectangle into two congruent triangles.

3. Let $ABCD$ be a parallelogram, and let M be the intersection point of the diagonals.

- (a) Show that triangles $\triangle AMB$ and $\triangle CMD$ are congruent.
(b) Show that $AM = CM$, i.e., M is the midpoint of AC

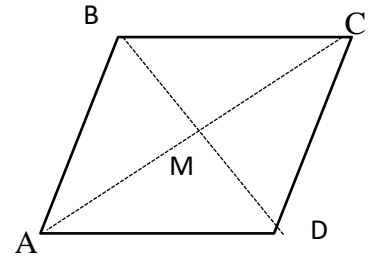


4. Let $ABCD$ be a quadrilateral such that sides AB and CD are parallel and equal (but we do not know whether sides AD and BC are parallel).

(a) Show that triangles $\triangle AMB$ and $\triangle CMD$ are congruent.

(b) Show that sides AD and BC are indeed parallel;
therefore, $ABCD$ is a parallelogram.

[Hint: Can you prove that $\triangle AMD$ and $\triangle CMB$ are congruent so that you find equal alternate interior angles?]



5. Calculate using the power rules (power of a product) :

(a) $3^3 2^3 \left(\frac{1}{6}\right)^3 =$

(b) $\left(\frac{2}{5}\right)^5 15^5 =$

(c) $\frac{64^4}{16^4} =$

(d) $\left(\frac{18}{51}\right)^2 \div \left(\frac{54}{17}\right)^2 =$

(e) $0.15^3 =$

[Hint: represent as a fraction and then as power of a product]