

Math 1312 Test 2 Review Questions

Test 2 covers chapters 3 and 4 from the textbook.

How to study: Study the class notes, review homework problems, and try to do as many exercises as you can from the textbook. Note that answers are provided at the back of the book to all odd numbered problems.

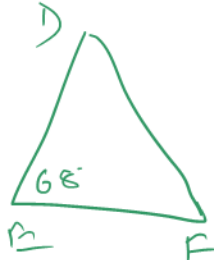
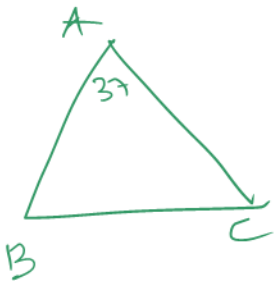
You need to know what definitions mean and theorems and postulates as facts but you do not need to memorize them word by word.

Here I provide some examples for you. This is not a complete list, studying only these examples is not enough!

1. It is given that $\triangle ABC \cong \triangle DEF$.

a) If $m\angle A = 37^\circ$ and $m\angle E = 68^\circ$, find $m\angle F$.

b) If $AB = 7.3\text{cm}$, $BC = 4.7\text{cm}$, and $AC = 6.3\text{cm}$, find EF .



$$\begin{aligned} m\angle A &= m\angle D = 37^\circ \\ m\angle B &= m\angle E = 68^\circ \\ m\angle C &= m\angle F = 75^\circ \end{aligned}$$

$$\begin{aligned} m\angle A + m\angle B + m\angle C &= 180 \\ m\angle C &= 180 - 37 - 68 = 75^\circ \end{aligned}$$

$$AB = DE = 7.3$$

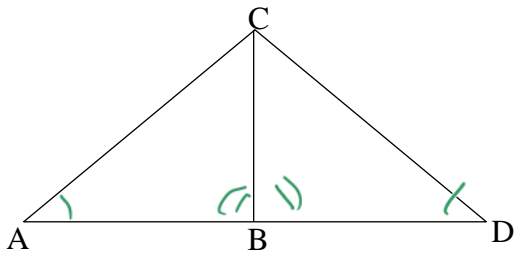
$$BC = EF = 4.7$$

$$AC = DF = 6.3$$

2.

a) Use ONLY the given information to state the reason why $\triangle ABC \cong \triangle DBC$.
 $\angle A \cong \angle D$, $\angle ABC \cong \angle DBC$, and $\overline{BC} \cong \overline{BC}$ (Identity).

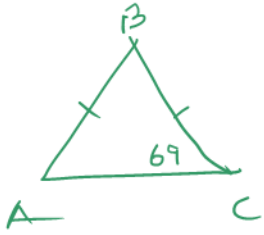
b) What additional parts needed to prove $\triangle ABC \cong \triangle DBC$ by ASA if we know that $\angle A \cong \angle D$ and $\angle ABC \cong \angle DBC$?



(a) AAS

(b) $\overline{AB} \cong \overline{BD}$

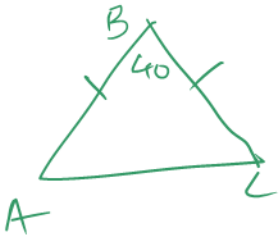
3. Given $\triangle ABC$ with $\overline{AB} \cong \overline{BC}$ and $m\angle C = 69^\circ$, find $m\angle A$. Draw a picture!



$$m\angle C = 69 \quad \therefore m\angle A = 69^\circ$$

$$m\angle B = 180 - 69 - 69 = 42^\circ$$

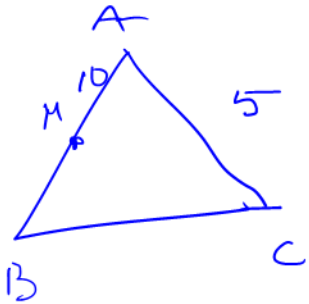
4. Given $\triangle ABC$ with $\overline{AB} \cong \overline{BC}$ and $m\angle B = 40^\circ$, find $m\angle A$. Draw a picture!



$$m\angle A = m\angle C$$

$$\therefore m\angle A = \frac{180 - 40}{2} = \frac{140}{2} = 70^\circ$$

5. Given $\triangle ABC$ with $\overline{AB} \cong \overline{BC}$, and M is the midpoint of \overline{AB} . Find the perimeter of $\triangle ABC$, if $AM = 10$ and $AC = 5$. Draw a picture!



$$AM = MB = 10 \quad (\text{as } M \text{ is the midpt})$$

$$\therefore AB = 20$$

$$BC = 20$$

$$\therefore \text{perimeter} = 20 + 20 + 5 = 45$$

6. The measures of two sides of a triangle are 3 and 4. Between what two numbers must the measure of the third side fall?

let x be the 3rd side

$$4 - 3 < x < 3 + 4$$

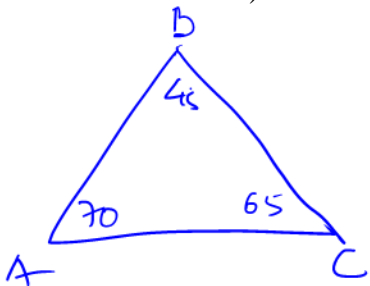
$$1 < x < 7$$

7. Is it possible to draw a triangle those sides measure

Yes \Rightarrow a) 8, 9, 10? \rightarrow $\left\{ \begin{array}{l} 8+9 = 17 > 10 \checkmark \\ 9+10 = 19 > 8 \checkmark \\ 8+10 = 18 > 9 \checkmark \end{array} \right.$
 No b) 8, 9, 17? \rightarrow $\left\{ \begin{array}{l} 8+9 = 17 > 17 \text{ X} \\ 8+9 = 17 > 18 \text{ X} \end{array} \right.$
 No c) 8, 9, 18?

8. In $\triangle ABC$, $m\angle A = 70^\circ$ and $m\angle B = 45^\circ$.

- a) Is it true that \overline{AB} is the longest side of that triangle?
 b) Write an extended inequality that compares the lengths of the sides of $\triangle ABC$.

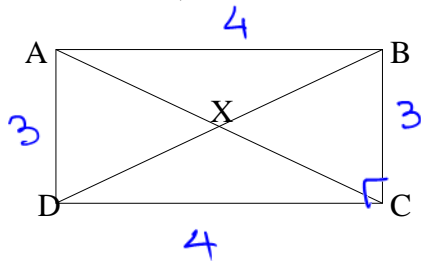


$$m\angle C = 180 - 70 - 45 = 65^\circ$$

$$\angle B < \angle C < \angle A$$

Shortest side $\Rightarrow AC < AB < BC \rightarrow$ Longest side

9. $AD = 3$, $DC = 4$. Find the length of the diagonal \overline{BD} .

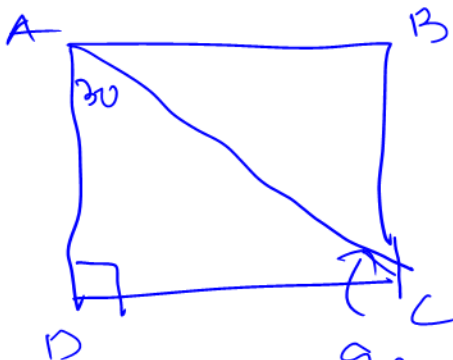


$ABCD$ is a rectangle

$$\begin{aligned}
 BD^2 &= BC^2 + CD^2 \\
 &= 3^2 + 4^2 \\
 &= 9^2 + 16 \\
 &= 25
 \end{aligned}$$

$$BD = \sqrt{25} = 5$$

10. $m\angle DAX = 30^\circ$. Find the measure of angle DCA .



$$m\angle DCA = 90 - 30 = 60$$

$$90 - 30 = 60$$

11. State whether each statement is Always True, Sometimes True, or Never True.

a) A square is a rectangle. **AT**



b) If two of the angles of a trapezoid are congruent, then the trapezoid is isosceles. **ST**

c) The diagonals of a trapezoid bisect each other. **NT**

d) The diagonals of a parallelogram are perpendicular. ~~NT~~ **ST**

e) A rectangle is a square. **ST**

f) The diagonals of a square are perpendicular. **AT**

g) Two consecutive angles of a parallelogram are supplementary. **AT**



h) Opposite angles of a rhombus are congruent. **AT**

i) The diagonals of a rectangle are congruent. **AT**

j) The four sides of a kite are congruent. **NT**

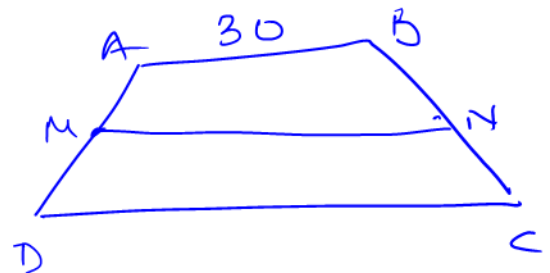
k) The diagonals of a parallelogram bisect each other. **AT**

12. Which of the following principal(s) do NOT exist?

AAA \cong ASA \cong AAS \cong SSS \cong SAS \cong **SSA** \cong

13. Find the length of the median of a trapezoid if its upper base is 30 and the length of the lower base is 6 more, than twice the length of the upper base.

$$\begin{aligned} DC &= 2(AB) + 6 \\ &= 2(30) + 6 \\ &= 60 + 6 = 66 \end{aligned}$$

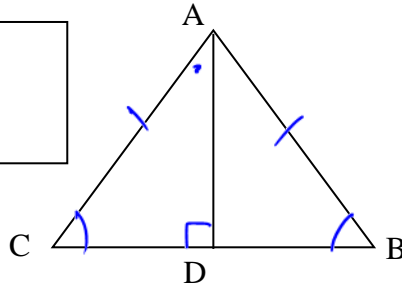


$$\begin{aligned} MN &= \frac{1}{2} (AB + CD) \\ &= \frac{1}{2} (30 + 66) = \frac{1}{2} (96) = 48 \end{aligned}$$

14. In an isosceles triangle ABC , \overline{AD} is an altitude. Find $m\angle C$.

$$\angle CAD = (9x - 27)^\circ$$

$$\angle BAD = (3x - 3)^\circ$$



In $\triangle ACD$ & $\triangle ABD$

$\angle C \cong \angle B$ (Isosc \triangle)

$\angle ADC \cong \angle ADB$ (each 90°)

$\overline{AD} \cong \overline{AD}$ (Reflexive)

$\therefore \triangle ACD \cong \triangle ABD$ (AAS)

$\therefore \angle CAD \cong \angle BAD$ (CPCTC)

$$\triangle ACD \cong \triangle ABD$$

$$9x - 27 = 3x - 3$$

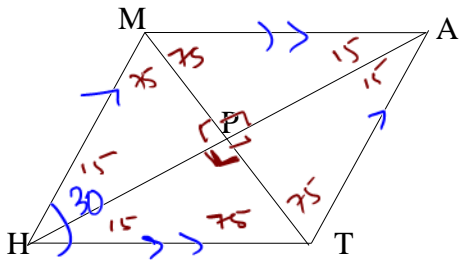
$$6x = 24$$

$$x = 4$$

$$m\angle CAD = 9(4) - 27 = 9^\circ$$

$$\therefore m\angle C = 90 - 9 = 81^\circ$$

15. In a rhombus $MATH$ with diagonals \overline{MT} and \overline{AH} , $m\angle MHT = 30^\circ$. Find $m\angle AHT$ and $m\angle ATH$.



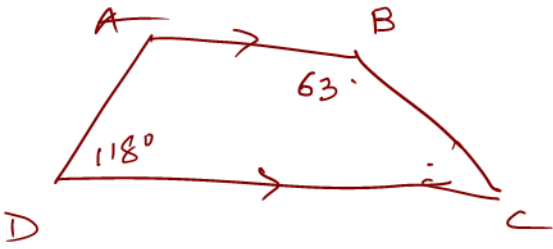
$$m\angle H + m\angle T = 180$$

$$m\angle T = 180 - 30 = 150^\circ$$

$$\therefore m\angle ATH = 150$$

$$m\angle AHT = \frac{1}{2} m\angle MHT = \frac{1}{2} 30 = 15$$

16. Find the measures of the remaining angles of trapezoid $ABCD$ with \overline{AB} parallel to \overline{DC} , if $m\angle B = 63^\circ$ and $m\angle D = 118^\circ$.



$$m\angle A + m\angle D = 180$$

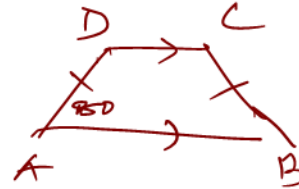
$$m\angle A = 180 - 118$$

$$= 62^\circ$$

$$m\angle B + m\angle C = 180$$

$$m\angle C = 180 - 63$$

$$= 117^\circ$$



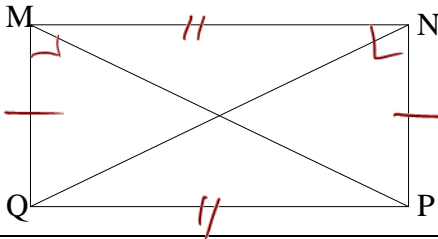
$$\angle B, \angle C, \angle D$$

$$63, 117, 118$$

17. Complete the following proof:

Given: rectangle $MNPQ$ with diagonals \overline{MP} and \overline{NQ} .

Prove: $\overline{MP} \cong \overline{NQ}$



PROOF	
Statements	Reasons
1. rectangle $MNPQ$ with diagonals \overline{MP} and \overline{NQ}	1. Question 17
2. $MNPQ$ is a parallelogram	2. Definition of a parallelogram
3. Question 18	3. Opposite sides of a parallelogram are congruent
4. $MQ \cong MP$	4. Question 19
$\angle MQP$ and $\angle PQM$ are right angles	5. Definition of rectangle
6. $\angle NMQ \cong \angle PQM$	6. All right angles are congruent
7. $\triangle NMQ \cong \triangle PQM$	7. Question 20
8. $MP \cong NQ$	8. CPCTC

17. Reason for Statement 1.

- A. Prove **B. Given** C. CPCTC D. Definition of a rectangle

18. Statement for 3.

- A. $MQ \cong NP$ and $MP \cong NQ$ B. $MP \cong NQ$ **C. $MN \cong QP$ and $MQ \cong NP$**

19. Reason for Statement 4.

- A. Symmetric B. Transitive **C. Reflexive**

20. Reason for Statement 7.

- A. SSS B. ASA **C. SAS** D. AAS