

20 questions 50 mins

### Math 1312 Test 1 Review Questions

**Test 1 covers chapters 1 and 2 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. Conditional statement:

*Two angles are complementary, if the sum of their measures is  $90^\circ$ .*

Hypothesis:

P: The sum of the measure of 2 angles is  $90^\circ$

Conclusion:

Q: The angles are complementary

Rewrite the conditional in the standard "If hypothesis, then conclusion" form.

If the sum of the measure of 2 angles is  $90^\circ$ ,  
then the angles are complementary

Converse:

If Q, then P If 2 angles are complementary, then  
the sum of the measure of 2 angles is  $90^\circ$ .

Inverse:

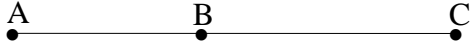
If not P, then not Q If the sum of the measure of 2  
angles is not  $90^\circ$ , then the angles are not  
complementary

Contrapositive:

If not Q, then not P

If the 2 angles are not complementary,  
then the sum of the measure of  
2 angles is not  $90^\circ$ .

2. Is  $B$  the midpoint of  $\overline{AC}$  if  $BC = x + 8$ ,  $AB = 2x - 6$ , and  $AC = 44$ ?



$$AB = BC \text{ (as } B \text{ mid-pt)}$$

$$x + 8 = 2x - 6$$

$$14 = x$$

$$AB + BC = AC$$

$$x + 8 + 2x - 6 = 44$$

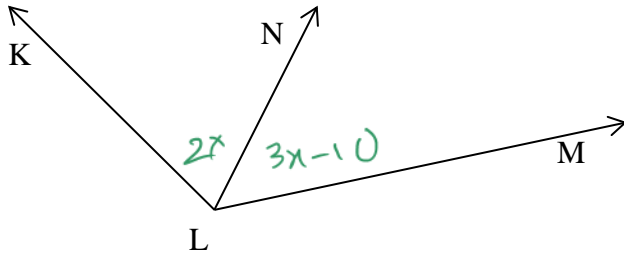
$$3x + 2 = 44$$

$$3x = 42$$

$$x = 14$$

AND

3. Find  $x$ , if  $m\angle KLN = (2x)^\circ$ ,  $m\angle NLM = (3x - 10)^\circ$ , and  $m\angle KLM = 100^\circ$ .



$$m\angle KLN + m\angle NLM = m\angle KLM$$

$$2x + 3x - 10 = 100$$

$$5x - 10 = 100$$

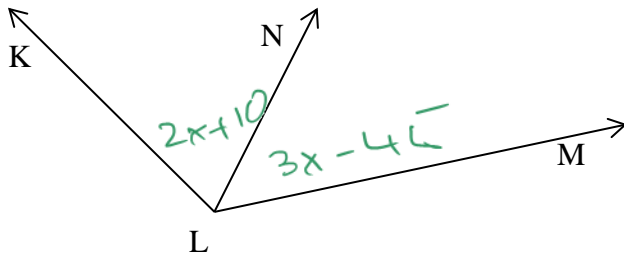
$$5x = 110$$

$$x = 22$$

$$\therefore m\angle KLN = 2(22) = 44$$

$$m\angle NLM = 3(22) - 10 = 66 - 10 = 56$$

4. Classify angle  $KLM$  if it is known that  $\overline{LN}$  is an angle bisector and  $m\angle KLN = (2x + 10)^\circ$  and  $m\angle NLM = (3x - 45)^\circ$



$$m\angle KLN = m\angle NLM$$

(as  $\overline{LN}$  is the  $\angle$  bisector)

$$2x + 10 = 3x - 45$$

$$55 = x$$

$$m\angle KLN = 2(55) + 10$$

$$= 110 + 10 = 120$$

$$\therefore m\angle KLM = 2(m\angle KLN) = 2(120) = 240^\circ$$

supplementary

5. If angles 1 and 2 form a linear pair (i.e.  $\angle 1$  and  $\angle 2$  are ~~complementary~~) and  $m\angle 1 = (6x + 10)^\circ$  and  $m\angle 2 = (2x + 10)^\circ$ , find  $x$ , and the measures of both angles.

$$m\angle 1 + m\angle 2 = 180^\circ$$

$$6x + 10 + 2x + 10 = 180$$

$$8x + 20 = 180$$

$$8x = 160$$

$$x = 20$$

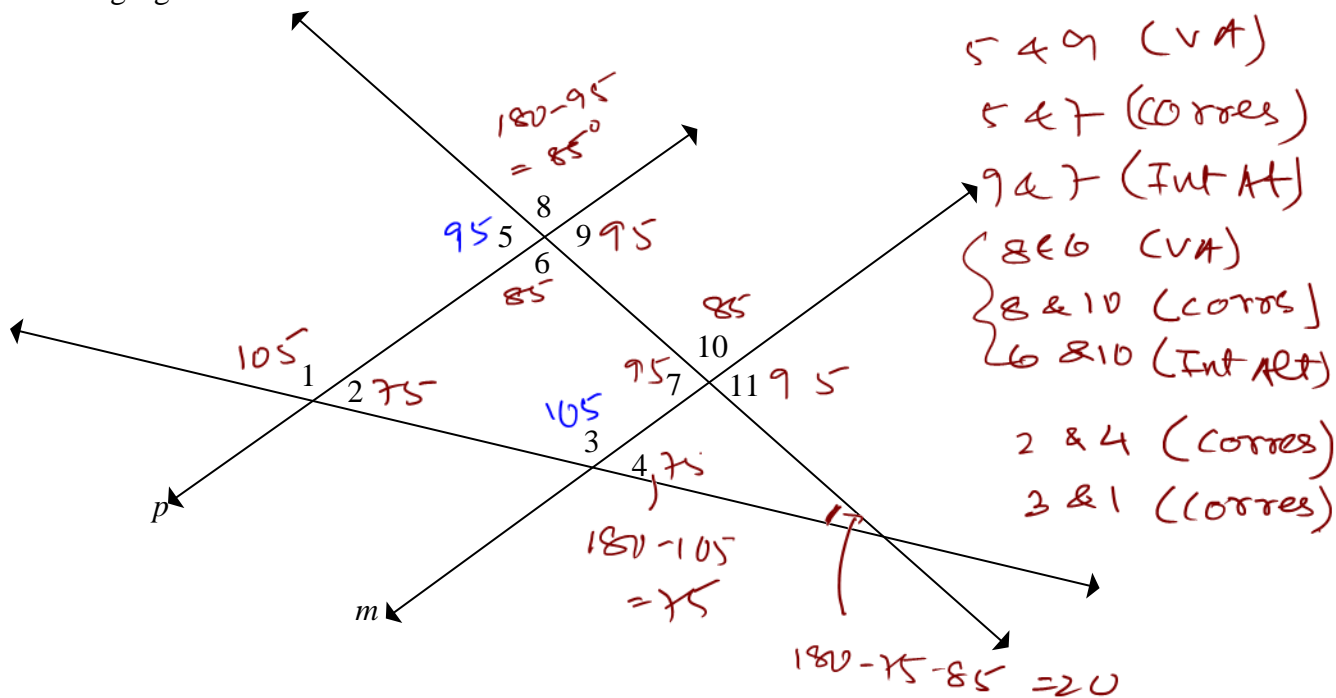
$$m\angle 1 = 6(20) + 10$$

$$= 130$$

$$m\angle 2 = 2(20) + 10$$

$$= 50^\circ$$

6. If  $p \parallel m$  and  $m\angle 3 = 105^\circ$  and  $m\angle 5 = 95^\circ$ , find the measures of all other angles in the following figure.



7. Identify the type of Reasoning used in the following examples.
- a. Michael received two Christmas gifts from his parents in the last three years. He believes he will receive two gifts for Christmas from his parents this year.

Induction

- b. All dogs are friendly. Molly has a very friendly pet named Rocky. Hence, Rocky is a dog.

No reasoning

8. Give an indirect proof of the following statement.

If two angles are not congruent, then these angles are not vertical angles.

Assump

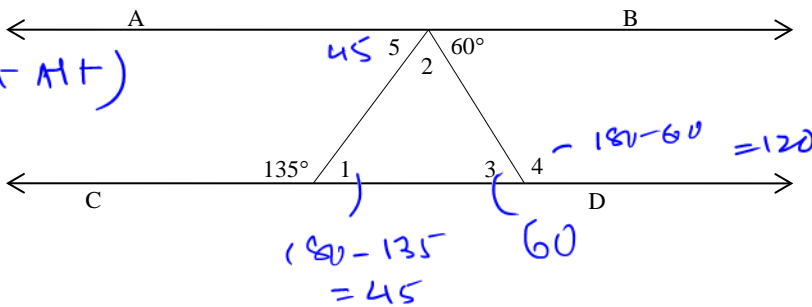
$\sim Q$ : The angles are vertical

To show

$\sim P$ : The angles are congruent.

9. Find the measures of angles 1-5 in the figure below, if  $\overline{AB} \parallel \overline{CD}$ .

$\angle 5$  &  $\angle 1$  (FMT ALT)



$$\begin{cases} \angle 1 + \angle 2 + \angle 3 = 180 \\ \angle 2 + \angle 3 = 135 \\ \angle 5 + \angle 2 + 60 = 180 \\ m\angle 2 = 75^\circ \end{cases}$$

10. Find the measure of an interior and exterior angles of a regular hexagon. **Know the formulas!**

$$\begin{aligned} S &= (n-2)180 \\ &= (6-2)180 \\ &= 4 \cdot 180 \\ &= 720 \end{aligned}$$

$$\begin{aligned} I &= \frac{(n-2)180}{n} \\ &= \frac{(6-2)180}{6} \\ &= 120 \end{aligned}$$

$$\begin{aligned} E &= \frac{360}{n} \\ &= \frac{360}{6} = 60 \end{aligned}$$

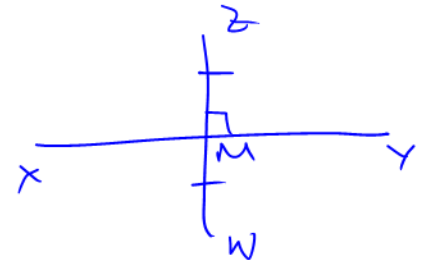
11. Classify a triangle if it is known that the sum of the measures of two angles of the triangle is equal to the third (largest) angle and none of the side lengths are equal to each other.

Scalene  
Right

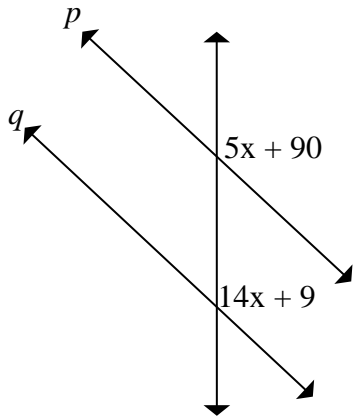
$$\begin{aligned} x, y, z &\rightarrow 3 \angle s \text{ of } \triangle \quad x + y = z \\ x + y + z &= 180 \\ z + z &= 180 \Rightarrow 2z = 180 \\ &\Rightarrow z = 90^\circ \end{aligned}$$

12. Given:  $\overline{XY}$  intersect  $\overline{ZW}$  at point M.  $\overline{ZM} \cong \overline{MW}$  and  $\overline{ZM} \perp \overline{XY}$ . Which of the following statements is true?

- i. Point M is the midpoint of  $\overline{ZW}$ . T
- ii. Point M is the midpoint of  $\overline{XY}$ . F
- iii.  $\overline{XY}$  is a bisector of  $\overline{ZW}$ . T
- iv.  $\overline{ZW}$  is a bisector of  $\overline{XY}$ . F
- v.  $\overline{XY}$  is the perpendicular bisector of  $\overline{ZW}$ . T
- vi.  $\overline{ZW}$  is the perpendicular bisector of  $\overline{XY}$ . F



13. Find  $x$  that insures that  $p \parallel q$ .



$$\begin{aligned}5x + 90 &= 14x + 9 \\81 &= 9x \\9 &= x\end{aligned}$$

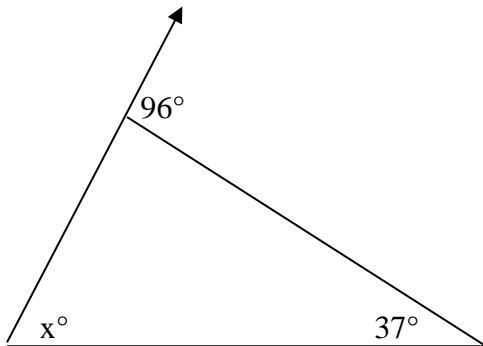
14. Decide whether the following is always true, sometimes true, or never true.

If  $\angle 1$  and  $\angle 2$  are complementary and  $\angle 2$  and  $\angle 3$  are complementary, then  $\angle 1$  and  $\angle 3$  are vertical.

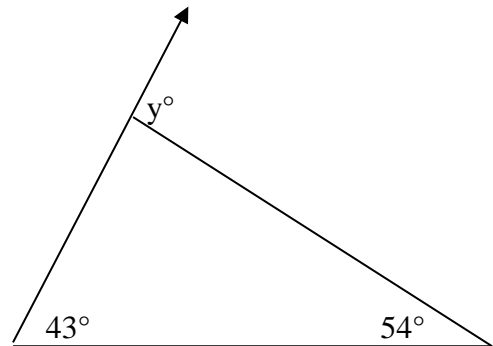


Sometimes true

15. Find the value of  $x$  and  $y$  in the following figures.

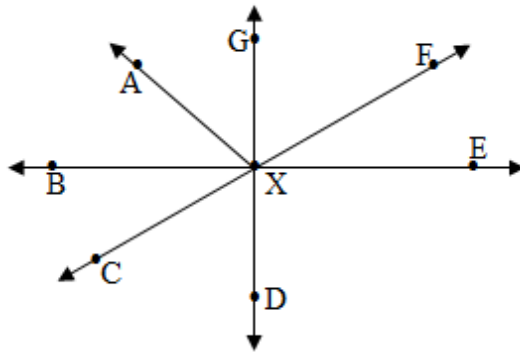


$$\begin{aligned}x + 37 &= 96 \\x &= 96 - 37 \\&= 59^\circ\end{aligned}$$



$$\begin{aligned}43 + 54 &= y \\97^\circ &= y\end{aligned}$$

16. If  $m\angle GXC = (2x + 15)^\circ$  and  $m\angle GXF = (3x + 5)^\circ$ , find the  $m\angle GXC$  and  $m\angle GXF$ .



$$m\angle GXC + m\angle GXF = 180$$

$$2x + 15 + 3x + 5 = 180$$

$$5x + 20 = 180$$

$$5x = 160$$

$$x = 32$$

$$m\angle GXC = 2(32) + 15 = 79^\circ$$

$$m\angle GXF = 3(32) + 5 = 101^\circ$$

17. Complete the following proof.

Given:  $B$  is the midpoint of  $\overline{AC}$ .

Prove:  $AB = \frac{AC}{2}$



PROOF	
Statements	Reasons
1. $B$ is the midpt of $AC$	1. Given
2. $AB = BC$	2. Def of mid pt
3. $AB + BC = AC$	3. Segment Addition post.
4. $AB + AB = AC$	4. Substitution
5. $2(AB) = AC$	5. Addition/Substitution
6. $AB = \frac{AC}{2}$	6. Division Property of Equality