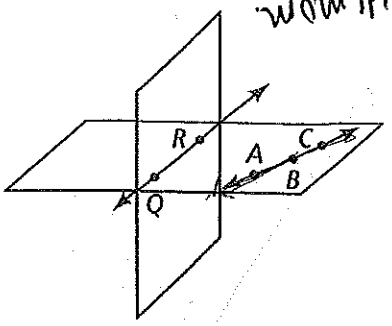
Geometry 22: REVIEW for Quiz 1.2-1.5

Name ANSWERS
Period _____ Date _____

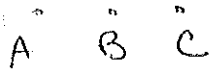
Use the diagram to give an example of each of the following using proper NOTATION!



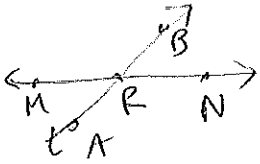
1. Line (name the same line 2 different ways if possible) $\overleftrightarrow{AB}$, $\overleftrightarrow{BC}$
2. Ray (name the same ray 2 different ways if possible) $\overrightarrow{AC}$, $\overrightarrow{AB}$
3. Segment (name the same segment 2 different ways if possible) $\overline{QR}$, $\overline{RQ}$
4. Intersection of the 2 planes shown $\overleftrightarrow{RQ}$
5. Intersection of plane QRA and line BC $\overleftrightarrow{BC}$
6. 3 collinear points A, B, C
7. 3 noncollinear points R, A, C
8. A pair of opposite rays $\overrightarrow{BC}$ and $\overrightarrow{BA}$

Draw a sketch and label as needed. Do the best that you can with the drawings.

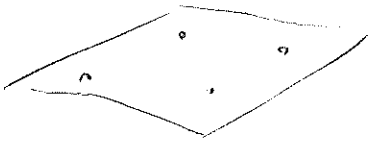
9. Three collinear points *A, B,* and *C.*



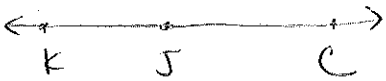
10. $\overleftrightarrow{MN}$ intersecting $\overleftrightarrow{AB}$ at point *R.*



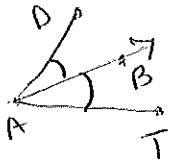
11. Coplanar points *W, X, Y,* and *Z.*



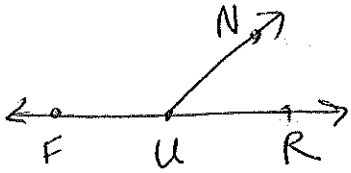
12. Collinear rays, $\overrightarrow{JK}$ and $\overrightarrow{JC}$



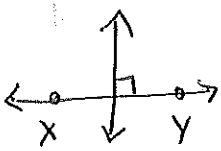
13. ray AB bisecting <DAT



14. Linear pair with <FUN and <NUR



15. perpendicular bisector of segment XY



16. Adjacent complementary angles

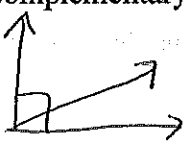
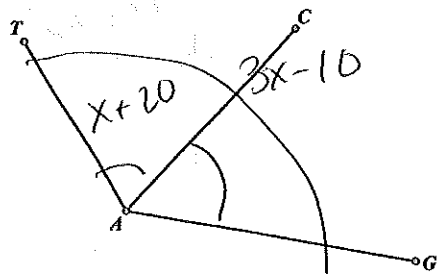
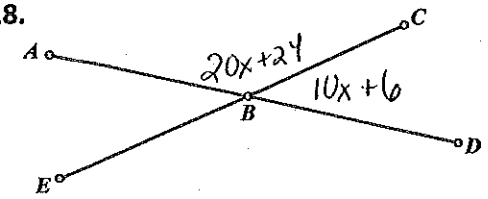
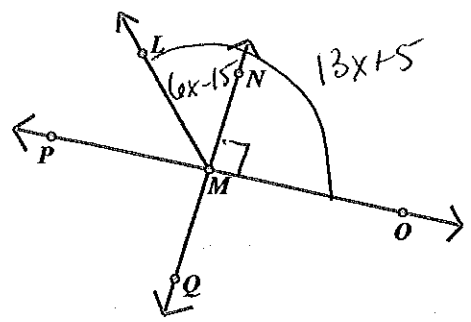
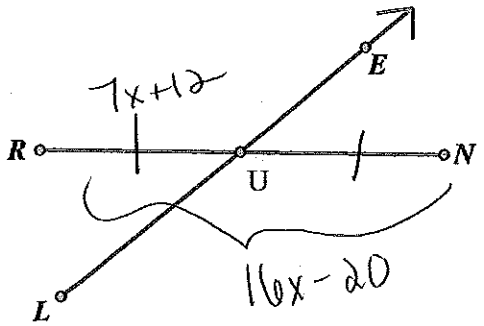


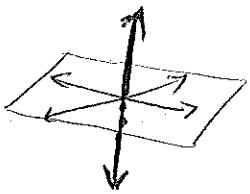
DIAGRAM	GIVEN INFORMATION	EQUATION	X =	FIND:
16. 	AB = 14 AC = 42 BC = x	$14 + x = 42$ -14 $x = 28$	X = 28	BC = 28
17. 	<TAC ≅ <CAG m<TAC = x + 20° m<TAG = 3x – 10	$2(x+20) = 3x-10$ $2x + 40 = 3x - 10$ $50 = x$	X = 50	m<TAG= 140°
18. 	m< ABC = 20x + 24 m<CBD = 10x + 6	$20x + 24 + 10x + 6 = 180$ $30x + 30 = 180$ $30x = 150$ $x = 5$	X = 5	m<EBD = 124° m<CBD = 56°
19. 	<NMO is a right < m<LMN = 6x – 15 m<LMO = 13x + 5	$6x - 15 + 90 = 13x + 5$ $6x + 75 = 13x + 5$ $70 = 7x$ $x = 10$	X = 10	m<LMN = 45° m<PML = 45°
	$\overrightarrow{LE}$ bisects $\overline{RN}$ (so point U is the midpoint of $\overline{RN}$) RU = 7x + 12 NR = 16x – 20	$2(7x+12) = 16x - 20$ $14x + 24 = 16x - 20$ $44 = 2x$ $x = 22$	X = 22	RU = 166 UN = 166 NR = 332

Decide whether the statement is *true* or *false*. *Briefly explain your answer*.

21. Lines have endpoints. False, infinite

22. Planes have edges. False, infinite

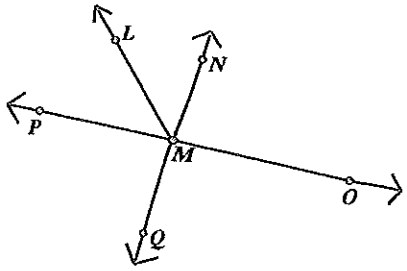
23. Three lines that intersect at the same point must all be in the same plane. False



24. Two planes may intersect a third plane without intersecting each other.

~~False~~ True

Complete the following using the diagram at right;



25. Angle addition postulate

m<LMN + <NMO = m<LMO

26. Segment addition postulate

PM + MO = PO

27. Circle the 4 expressions that make sense. (one from each column)

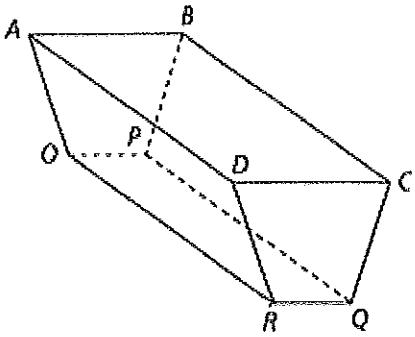
AB ≅ CD	$\overline{XY}$ = 12 cm	m<FEG = 32°	m<ABC ≅ m<DEF
$\overline{AB} \cong \overline{CD}$	XY = 12 cm	<FEG = 32°	m<ABC = m<DEF

Complete the following sentences.

28. Two distinct planes intersect at a one line.

29. Through any 2 points, there is exactly one line.

Use the figure at the right to answer the following questions.



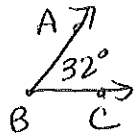
30. Are points *O, B, R,* and *C* coplanar? yes

31. Name three lines that intersect at *P*. $\overleftrightarrow{OP}$, $\overleftrightarrow{BP}$, $\overleftrightarrow{QP}$

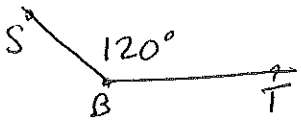
32. What is the intersection of plane AOB and plane POR? $\overleftrightarrow{OP}$

Draw a sketch of each of the following. Make up values for any angles or segments you draw, and mark your diagrams with congruence marks whenever appropriate.

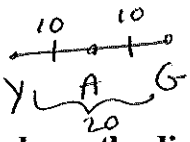
33. acute angle ABC



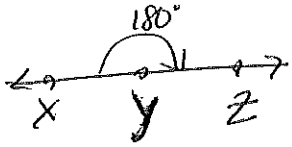
34. Obtuse angle SBT



35. $\overline{YG}$ with midpoint A

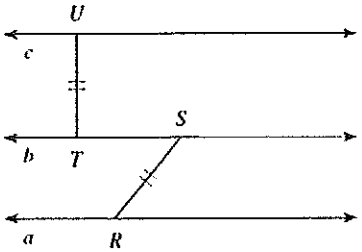


36. Straight angle XYZ



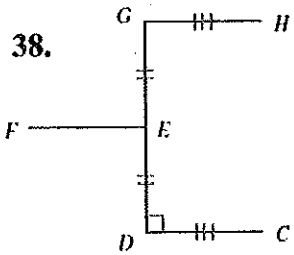
Using proper notation, list all information given by the marks on the diagram.

37.



$\overline{UT} \cong \overline{SR}$

38.



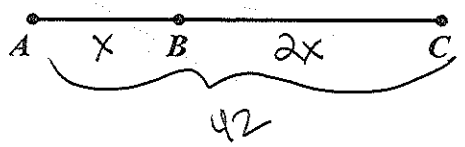
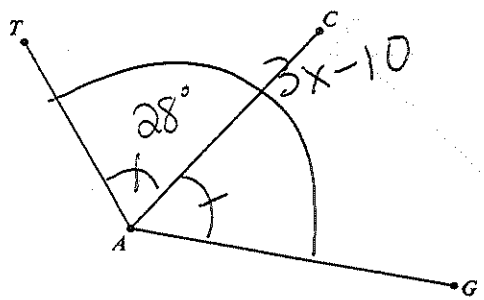
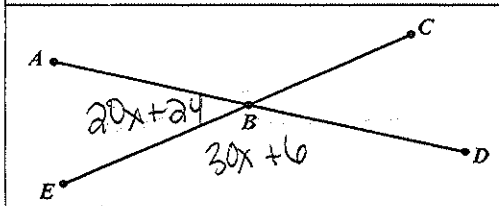
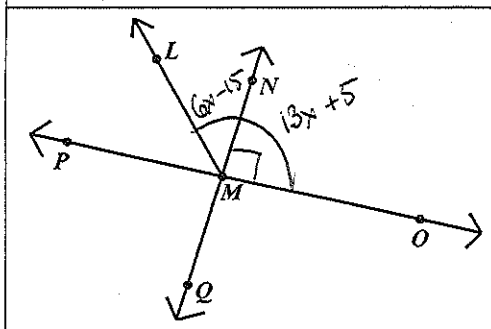
$\overline{GE} \cong \overline{DE}$

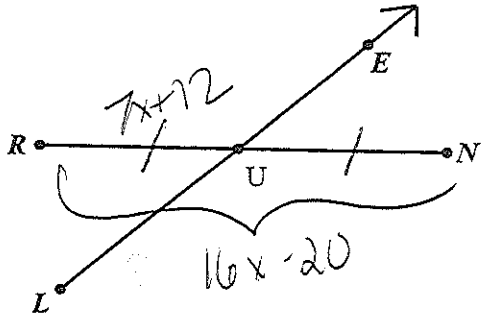
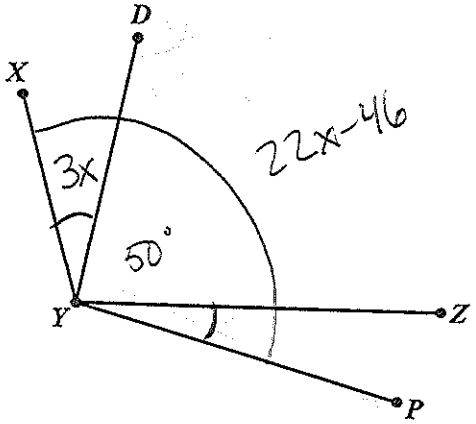
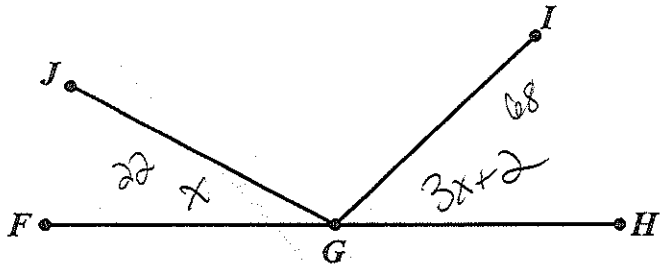
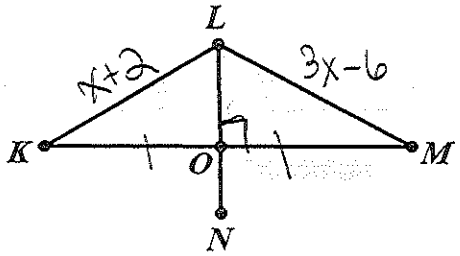
$\overline{GH} \cong \overline{DC}$

$\overline{GD} \perp \overline{DC}$

Geometry (chapter 1) **Marking Diagrams and Writing Equations** (L.E.S.A.!!) Name ANSWERS per. _____

Label and mark each diagram with the given INFORMATION, then write the EQUATION *that matches the diagram*. SOLVE for x, then find the missing values.

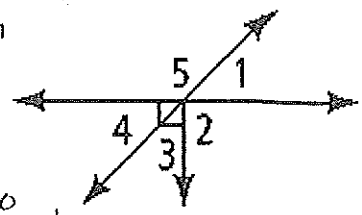
DIAGRAM	GIVEN INFORMATION	EQUATION	X =	FIND:
	BC is twice as long as AB AC = 42	$x+2x=42$ $3x=42$ $x=14$ **Reason:** Seg. Add. Post	X = 14	AB = 14 BC = 28
	$\overline{AC}$ is the angle bisector of <TAG m<TAC = 28° m<TAG = 3x – 10	$28+28=3x-10$ $56=3x-10$ $66=3x$ **Reason:** Defn. ∡ bisc. ∡ add. Post.	X = 22	m<TAG= 56°
	m< ABE = 20x + 24 m<EBD = 30x + 6	$20x+24+30x+6=180$ $50x+30=180$ $50x=150$ **Reason:** Defn. Lin. Pr.	X = 3	m<EBD = 96° m<CBD = 84°
	$\overline{NQ} \perp \overline{PO}$ m<LMN = 6x – 15 m<LMO = 13x + 5	$6x-15+90=13x+5$ $6x+75=13x+5$ $70=7x$ $x=10$ **Reason:** ∡ add. Post	X = 10	m<LMN = 45° m<PML = 45°

	$\overline{LE}$ bisects $\overline{RN}$ RU = 7x + 12 NR = 16x – 20	7x+12 + 7x+12 = 16x-20 14x+24=16x-20 44 = 2x x **Reason:** defn. bisect seg. Add Post	X = 22	RU = 166 UN = 166 NR = 332
	<XYD $\cong$ <ZYP m< XYD = 3x m< DYZ = 50° m< XYP = 22x – 46	3x+3x+50 = 22x-46 6x+50 = 22x-46 96 = 16x x=6 **Reason:** ∠ add Post	X = 6	m< XYD = 18° m< XYP = 86°
	<FGJ and <IGH are complementary angles m<IGH = 3x + 2 m<FGJ = x	3x+2+x=90 4x=88 x=22 **Reason:** defn. compl. ∠	X = 22	m<IGH = 68 m<JGI = 90
	KO = OM $\overline{LO} \perp \overline{KM}$ KL = x + 2 LM = 3x – 6	x+2=3x-6 8 = 2x x=4 **Reason:**	X = 4	LN is the ⊥ bisector of KM LM = 6

Name ANSWERS Period_____ Date_____

Geometry 22: Practice with (1.2→) 1.5

1. Use the diagram at the right to decide if each is true or false. Explain

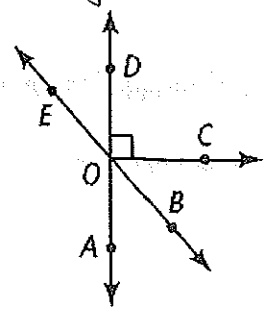


a. ∠2 and ∠5 are adjacent angles. False, Don't share a side

b. ∠1 and ∠4 are vertical angles. True

c. ∠4 and ∠5 are complementary. False, they are lin. pr., so supplementary

2. Name an angle or angles in the diagram described by each of the following.

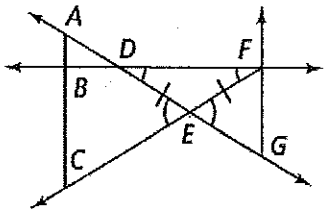


a. complementary to ∠*BOC* ∠BOA

b. supplementary to ∠*DOB* ∠AOB

c. adjacent to ∠*AOC* ∠DOC

3. For the following exercises, can you make each conclusion from the information in the diagram below? Explain.



a. $\angle BCE \cong \angle FGE$ NO

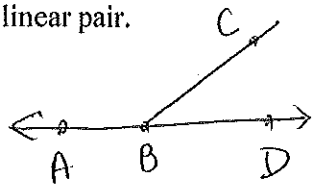
b. $\overline{FE} \cong \overline{EG}$ NO

c. $\overline{DE} \cong \overline{EF}$ yes

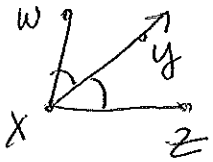
d. ∠*ADB* and ∠*FDE* are vertical angles yes

4. Sketch the following situations with appropriate tick marks.

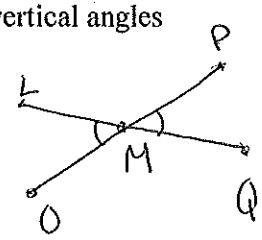
a. ∠*ABC* and ∠*CBD* form a linear pair.



b. $\overrightarrow{XY}$ bisects ∠*WXZ*



c. ∠*LMO* and ∠*PMQ* are vertical angles



5. Using the diagram below, given that $m\angle AOB = 4x - 1$; $m\angle BOC = 2x + 15$; $m\angle AOC = 8x + 8$. Solve for *x*. Find the angle measures.

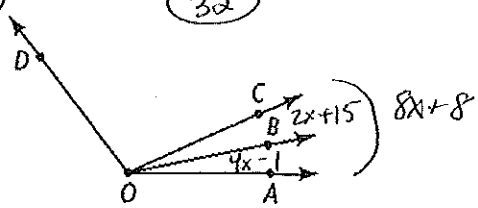
11° 21° 32°

$4x - 1 + 2x + 15 = 8x + 8$

$6x + 14 = 8x + 8$

$6 = 2x$

$x = 3$

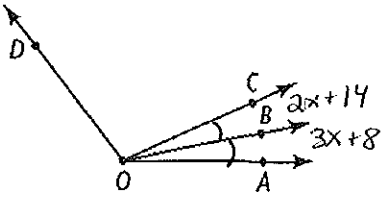


6. Using the diagram below, given that $\overrightarrow{OB}$ bisects ∠*COA*. Given that $m\angle AOB = 3x + 8$ and $m\angle BOC = 2x + 14$. What are $m\angle AOB$ and $m\angle AOC$?

26° 52°

$3x + 8 = 2x + 14$

$x = 6$



23° 67°

7. $\angle JKL$ and $\angle MNP$ are complementary; $m\angle JKL = 2x - 3$ and $m\angle MNP = 5x + 2$. What are $m\angle JKL$ and $m\angle MNP$? Show a check for your answer.

$2x - 3 + 5x + 2 = 90$

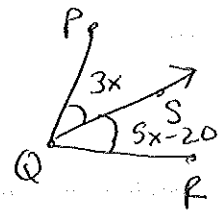
$7x - 1 = 90$

$7x = 91$

$x = 13$

8. $\overrightarrow{QS}$ bisects $\angle PQR$. Solve for x and find $m\angle PQR$. *Hint: Draw a diagram*

a. $m\angle PQS = 3x$; $m\angle SQR = 5x - 20$



$3x = 5x - 20$

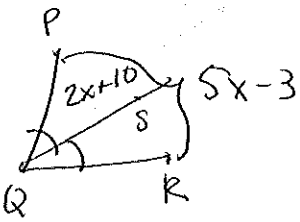
$20 = 2x$

$\boxed{x = 10}$

$\boxed{m\angle PQR = 60°}$

b. $m\angle PQS = 2x + 10$; $m\angle PQR = 5x - 3$

56°



$2x + 10 + 2x + 10 = 5x - 3$

$4x + 20 = 5x - 3$

$\boxed{23 = x}$

$\boxed{m\angle PQR = 112°}$

9. The measure of one angle is 38° less than the measure of its *complement*. Find the measure of each angle.

$x + y = 90$

$x = y - 38$

x = angle

y = its complement

$y - 38 + y = 90$

$2y - 38 = 90$

$2y = 128$

$y = 64$

$\boxed{64° \text{ and } 26°}$

10. If $\angle 1$ and $\angle 2$ are form a linear pair. $m\angle 1$ is 12 more than 6 times the $m\angle 2$, find $m\angle 1$ and $m\angle 2$.

$m\angle 1 = x =$

$m\angle 2 = y$

~~$m\angle 1 = 6(x) + 12$~~

$x = 6y + 12$

$x + y = 180$

$6y + 12 + y = 180$

$7y + 12 = 180$

$7y = 168$

$y = 24$

$\boxed{m\angle 1 = 156° \quad m\angle 2 = 24°}$

11. If $\angle 1$ and $\angle 2$ are complementary, $m\angle 1 = x^2 - 2x$ and $m\angle 2 = 27°$. Find x and $m\angle 1$. Check your answers!

$x^2 - 2x + 27 = 90$

$x^2 - 2x - 63 = 0$

$(x - 9)(x + 7) = 0$

$\boxed{x = 9, -7}$

$m\angle 1 = x^2 - 2x$

$9^2 - 2(9)$ or $(-7)^2 - 2(-7)$

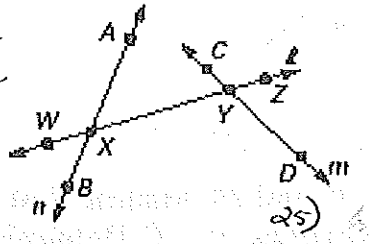
$81 - 18$ $\quad 49 + 14$

63° 63°

Geometry 21 **Extra Practice 1.2 – 1.5** Name _____ per _____

Decide whether the statement is *true* or *false*.

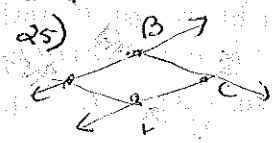
1. Point Y lies on line m. T
2. X, Y, and Z are collinear. T
3. Point W lies on line m. F
4. X, Y, and Z are coplanar. T
5. $\overrightarrow{YW}$ and $\overrightarrow{YD}$ are collinear. F
6. $\overrightarrow{YW}$ and $\overrightarrow{YD}$ are coplanar. T
7. $\overrightarrow{YX}$ and $\overrightarrow{YZ}$ are collinear. T
8. $\overrightarrow{YX}$ and $\overrightarrow{YZ}$ are coplanar. T



Sketch the lines, segments, and rays. Label your sketch.

25. Draw four noncollinear points A, B, C, and D. Then sketch $\overleftrightarrow{AB}$, $\overrightarrow{BC}$, $\overrightarrow{CD}$, and $\overline{DA}$.
26. Draw five noncollinear points M, N, O, P, and Q. Then sketch $\overline{MN}$, $\overrightarrow{OP}$, $\overrightarrow{PQ}$, $\overleftrightarrow{MP}$, and $\overline{NO}$.
27. Draw three collinear points H, I, and J with I between H and J. Add a point K between I and J.
28. Draw two points S and T. Then sketch $\overrightarrow{ST}$. Add a point U on the ray so that T is between S and U.

25)



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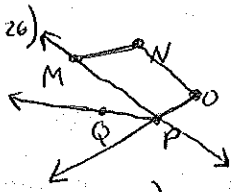

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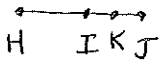

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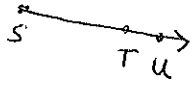
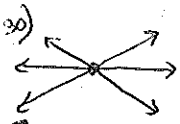


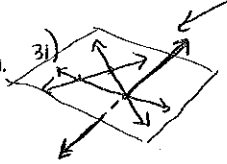
Sketch the figure described, if possible.

29. Three points that are collinear but not coplanar. not possible
30. Three lines that intersect at a single point.
31. A set of four lines that has three points of intersection.
32. Three lines that do not intersect.
33. Two planes that intersect in a line.
34. Two planes that intersect in a single point. not possible
35. Two rays that intersect at more than one point. $\overrightarrow{BA}$ and $\overrightarrow{BC}$
36. Two collinear rays that do not intersect.

30)

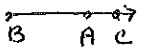


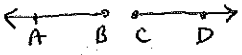
31)



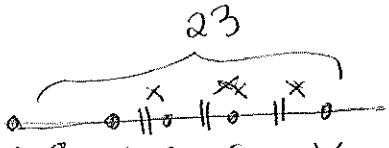
32)

33)





In Exercises 5–8, use the following information.
S is between T and V. R is between S and T. T is between R and Q. $QV = 23$, $QT = 8$, and $TR = RS = SV$. Make a sketch and answer the following.



$3x+8=23$
$3x=15$
$x=5$

5. Find RS. 5
6. Find QS. 18
7. Find TS. 10
8. Find TV. 15

Suppose J is between H and K. Use the Segment Addition Postulate to solve for x. Then find the length of each segment.

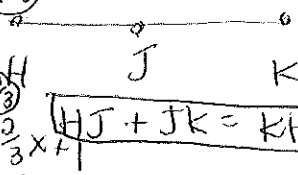
9. $HJ = 3(x + 2)$ 27
   $JK = 3x - 4$ 17
   $KH = 44$

   $3x+6+3x-4=44$
   $6x+2=44$ $6x=42$ $\boxed{x=7}$

10. $HJ = 8x - 3$ 45
    $JK = 12x - 5$ 67
    $KH = 112$

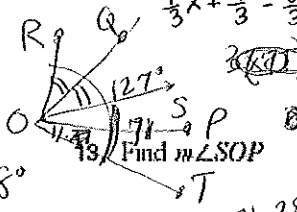
    $8x-3+12x-5=112$
    $20x-8=112$
    $20x=120$ $\boxed{x=6}$

11. $HJ = \frac{1}{3}x + 4$ $\frac{23}{3}$ $7\frac{2}{3}$
    $JK = 2x + \frac{2}{3}$ $22\frac{2}{3}$
    $KH = 2\frac{2}{3}x + 1\frac{91}{3}$ $30\frac{1}{3}$



$\boxed{HJ + JK = KH}$
$\frac{1}{3}x+4+2x+\frac{2}{3}=2\frac{2}{3}x+1$
$\frac{7}{3}x+\frac{14}{3}=\frac{8}{3}x+\frac{3}{3} \Rightarrow \frac{1}{3}x=\frac{11}{3}$ $\boxed{x=11}$

In Exercises 10–13, use the following information.
Q is in the interior of $\angle ROS$. S is in the interior of $\angle QOP$. P is in the interior of $\angle SOT$. $m\angle ROT = 127°$, $m\angle SOT = 71°$, and $m\angle ROQ = m\angle QOS = m\angle POT$. Make a sketch and answer the following.



$71+2x=127$
-71 -71
$2x=56$
$x=28$

10. Find $m\angle QOP$ 71°
11. Find $m\angle QOT$ 99°
12. Find $m\angle ROQ$ 28°
13. Find $m\angle SOP$ 43°

Let Q be in the interior of $\angle POR$. Use the Angle Addition Postulate to solve for x. Find the measure of each angle.

14. $m\angle POQ = (x + 4)°$ 12°
    $m\angle QOR = (2x - 2)°$ 14
    $m\angle POR = 26°$

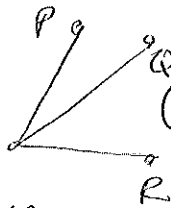
    $x+4+2x-2=26$
    $3x+2=26$
    $x=8$

15. $m\angle POQ = (3x + 7)°$ 28°
    $m\angle QOR = (5x - 2)°$ 33°
    $m\angle POR = 61°$

    $3x+7+5x-2=61$
    $8x+5=61$ $x=7$
    $8x=56$

16. $m\angle POQ = (\frac{1}{3}x + \frac{1}{3})°$
    $m\angle QOR = (2x + \frac{4}{3})°$
    $m\angle POR = (5x - 1)°$

    $3\left(\frac{1}{3}x+\frac{1}{3}+2x+\frac{4}{3}=5x-1\right)$
    $(x+1+6x+4=15x-3)$
    $7x+5=15x-3$

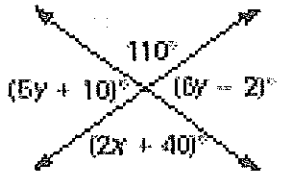


$x=1$

$m\angle POQ + m\angle QOR = m\angle POR$

Find the value(s) of the variable(s).

13.



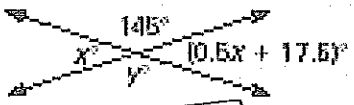
$2x + 40 = 110$

$2x = 70$ $\boxed{x = 35}$

$5y + 10 = 6y - 2$

$\boxed{12 = y}$

14.



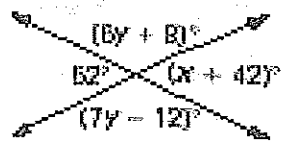
$\boxed{y = 145°}$

$x = .5x + 17.5$

$.5x = 17.5$

$\boxed{x = 35}$

15.



$6y + 8 = 7y - 12$

$\boxed{20 = y}$

$52 = x + 42$

$\boxed{10 = x}$

In Exercises 19 and 20, assume that $\angle A$ is supplementary to $\angle B$ and complementary to $\angle C$. Determine $m\angle A$, $m\angle B$, and $m\angle C$.

19. $m\angle A = (x + 10)°$, $m\angle B = (12x + 1)°$, $m\angle C = (5x + 2)°$

$x + 10 + 12x + 1 = 180$

$13x + 11 = 180$

$13x = 169$

$\boxed{x = 13}$

$x + 10 + 5x + 2 = 90$

$6x + 12 = 90$

$6x = 78$

$\boxed{x = 13}$

20. $m\angle A = (2.5x + 17)°$, $m\angle B = (21x - 25)°$, $m\angle C = (8x - 11)°$

$2.5x + 17 + 21x - 25 = 180$

$23.5x - 8 = 180$

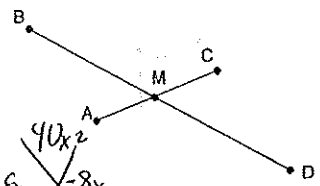
$23.5x = 188$ $\boxed{x = 8}$

$2.5x + 17 + 8x - 11 = 90$

$10.5x + 6 = 90$

$10.5x = 84$ $\boxed{x = 8}$

In the figure below (not drawn to scale), $\overline{AC}$ and $\overline{BD}$ bisect each other. For the following problems, find all possible values for x and find the measure(s) of each segment.



1. $BM = 3x^2 - 7x + 10$ and $MD = x^2 + 6x - 10$

$3x^2 - 7x + 10 = x^2 + 6x - 10$

$2x^2 - 13x + 20 = 0$

$(x - 4)(2x - 5) = 0$

-5	$-5x$	20
$2x$	$2x^2$	$-8x$
	x	-4

$40x^2$, $-5x$, $-8x$, $-13x$

$x = 4$, or $\frac{5}{2}$

$BM = MD = 30$ or $BM = MD = 11.25$

2. $MC = 2(x - 3)$ and $AC = 3(x + 5)$

$2(2x - 6) = 3x + 15$

$4x - 12 = 3x + 15$

$x = 27$

$MC = AC = 96$

3. In the figure below (not drawn to scale), $\overline{GI}$ bisects $\angle HGF$, $m\angle FGI = (5x^2 + 9x - 20)°$, and $m\angle HGI = (4x^2 + 5x + 1)°$.

$(4x^2 + 5x + 1) = 5x^2 + 9x - 20$

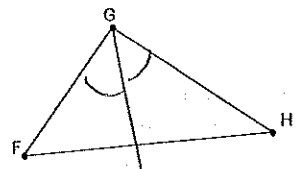
$\cancel{8x^2 + 10x + 2 = 5x^2 + 9x - 20}$

$\cancel{3x^2 + x + 22 = 0}$

$0 = x^2 + 4x - 21$

$0 = (x - 3)(x + 7)$

$\boxed{x = 3, -7}$



$-1 \pm \sqrt{1^2 - 4(3)(-22)}$