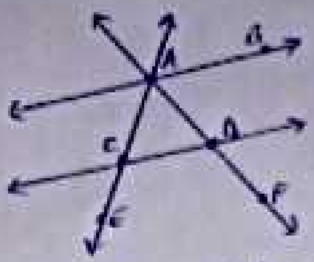
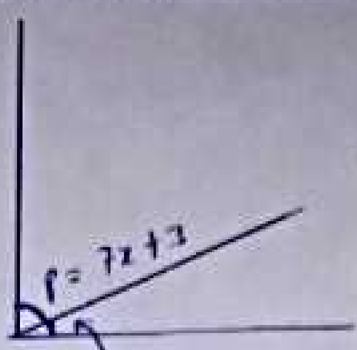
1)



collinear points are points on the same line. The point that is collinear to points A and B is F

B·F

2)



Complementary angles add up to 90°

$7x+3+16x-5=90°$

$7x+16x=90-3+5$

$\frac{23x}{23}=\frac{92}{23}$

$x=4$

$m\angle P = 7(4)+3 = \underline{31°}$

3) $L(-4,3)$ and $M(-7,-2)$

The length LM

$= \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$= \sqrt{(-7--4)^2+(-2-3)^2}$

$= \sqrt{(-3)^2+(-5)^2}$

$= \sqrt{9+25}$

$= \underline{\sqrt{34}}$

4)

midpoint $= \frac{x_2+x_1}{2}, \frac{y_1+y_2}{2}$

$x = \frac{5+-3}{2}$

$= \frac{2}{2}$

$= 1$

$y = \frac{-1+8}{2}$

$y = \frac{7}{2}$

$y = 3.5$

$(x,y) = \underline{(1, 3.5)}$

5)

Midpoint $= \frac{X_2+X_1}{2}, \frac{Y_1+Y_2}{2}$

$\frac{x+5}{2}=2$

$x+5=4$

$x=4-5$

$x=-1$

$\frac{y+-9}{2}=-4$

$y-9=-8$

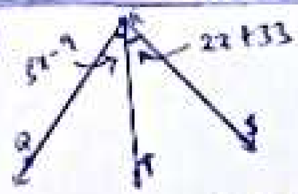
$y=-8+9$

$y=1$

$(x,y) = (-1,1)$

$= \underline{(-1,1)}$

6)



If RT bisects m∠QRS, This implies that

$m\angle QRT = \angle SRT$

$5x-9=2x+33$

$5x-2x=33+9$

$3x=42$

$x=14$

$\angle SRT = 2(14)+33$

$= 28+33$

$= \underline{61°}$

7)

These are supplementary angles and they add up to 180°

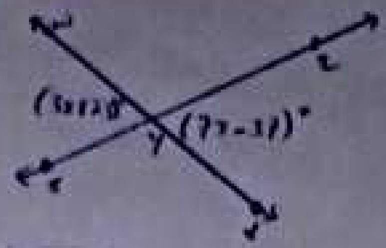
$\Rightarrow (8x+5)^\circ + (13x-14)^\circ = 180^\circ$

$8x+13x = 180-5+14$

$\frac{21x}{21} = \frac{189^\circ}{21}$

$x = 9$

8)



$(3x+23)^\circ = (7x-37)^\circ \Rightarrow$ vertical angles are equal

$3x-7x = -37-23$

$\frac{-4x}{-4} = \frac{-60}{-4}$

$x = 15$

$y + (7x-37)^\circ = 180^\circ \Rightarrow$ supplementary angles add up to 180°

$y + (7(15)-37)^\circ = 180$

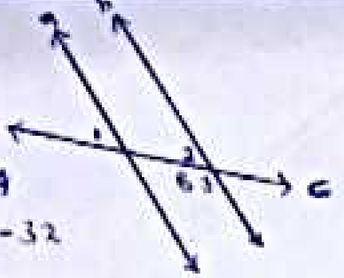
$y + 68 = 180^\circ$

$y = 180-68$

$y = 112^\circ$

9)

$a \parallel b$



$m\angle 1 = 9x-4$

$m\angle 2 = 13x-32$

$9x-4 = 13x-32 \Rightarrow$ Corresponding angles are equal

$9x-13x = -32+4$

$\frac{-4x}{-4} = \frac{-28}{-4}$

$x = 7$

$m\angle 3 + \angle 2 = 180^\circ \Rightarrow$ supplementary angles add up 180°

$13(7)-32+B = 180^\circ$

$91-32+B = 180^\circ$

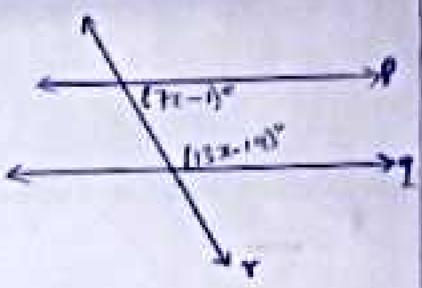
$59+B = 180^\circ$

$B = 180^\circ - 59^\circ$

$B = 121^\circ$

$m\angle 3 = 121^\circ$

10) $p \parallel q$



$(7x-1)^\circ + (13x-19)^\circ = 180^\circ \Rightarrow$ consecutive interior angles add up to 180°

$7x^\circ - 1^\circ + 13x^\circ - 19^\circ = 180^\circ$

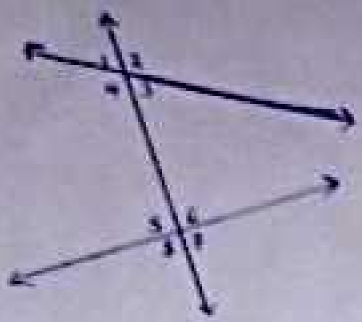
$20x^\circ - 20^\circ = 180^\circ$

$20x = 180+20^\circ$

$\frac{20x}{20} = \frac{200}{20}$

$x = 10^\circ$

11) – 14)



11) Set of Alternate interior Angles

($m\angle 4$ and $m\angle 6$)

($m\angle 3$ and $m\angle 5$)

12) Set of Consecutive Exterior Angles

($m\angle 1$ and $m\angle 8$)

($m\angle 2$ and $m\angle 7$)

13) Set of Corresponding Angles

($m\angle 1$ and $m\angle 5$)

($m\angle 2$ and $m\angle 6$)

14) Set of vertical Angles

($m\angle 1$ and $m\angle 3$), ($m\angle 2$ and $m\angle 4$)

($m\angle 5$ and $m\angle 7$), ($m\angle 6$ and $m\angle 8$)

15)

$$m = \frac{\Delta y}{\Delta x}$$

$$m = \frac{-3 - -5}{-1 - 7}$$

$$m = \frac{2}{-8}$$

$$= -\frac{1}{4}$$

16)

$$Y = -\frac{4}{3}x + 1$$

$$m_1 = -\frac{4}{3}$$

$$3x + 4y = 8$$

$$4y = -3x + 8$$

$$y = \frac{-3x + 8}{4}$$

$$m_2 = -\frac{3}{4}$$

$$3x - 4y = -28$$

$$-4y = -3x - 28$$

$$y = \frac{3}{4}x + \frac{28}{4}$$

$$m_3 = \frac{3}{4}$$

$$4x + 3y = -15$$

$$\frac{3y}{3} = \frac{-4x}{3} - \frac{15}{3}$$

$$y = -\frac{4}{3}x - 5$$

$$m_4 = -\frac{4}{3}$$

$$4x - 3y = 9$$

$$-3y = -4x + 9$$

$$y = \frac{4}{3}x - 3$$

$$m_5 = \frac{4}{3}$$

Line $Y = -\frac{4}{3}x + 1$ is parallel to line $4x + 3y = -15$

Parallel lines have the same slope

ie $m_1 = m_4 = -\frac{4}{3}$

C. $4x + 3y = -15$

17)

$3x + y = 10$

$(6, -5)$

$y = -3x + 10$

$m_1 = -3$

$m_2 = \frac{1}{3}$ ⇒ The slope of second line takes the negative reciprocal of the first line if they are perpendicular.

$(6, -5)$ (x, y)

$\frac{y+5}{x-6} = \frac{1}{3}$

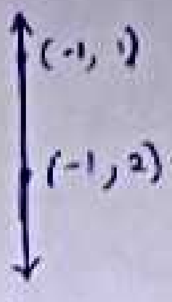
$3(y+5) = x - 6$

$3y + 15 = x - 6$

$\frac{3y}{3} = \frac{x}{3} - \frac{21}{3}$

$y = \frac{1}{3}x - 7$

18)



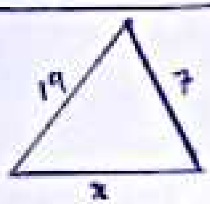
$m_1 = \frac{\Delta y}{\Delta x} = \frac{2-1}{-1 - -1} = \frac{1}{0}$

$m_1 = \infty$

$m_2 = \infty$ ⇒ Parallel lines have the same slope.

∴ The slope l_2 is ∞ undefined

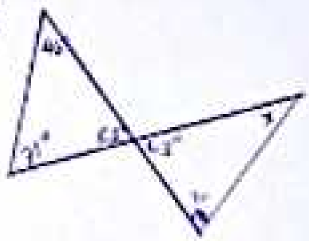
19)



The inequality that shows the value of x is that

$7 < x < 19$

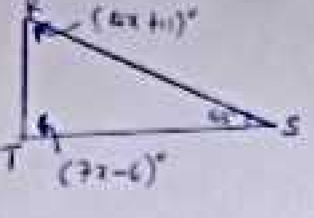
20)



$180 - (46 + 71)$
$= 63$

$x = 180 - (90 + 63)$
$= 27°$

21)



$7x-6+4x+11+43=180^\circ$

Angles in a triangle add up to 180°

$7x+4x=180+6-11-43$

$11x=175-43$

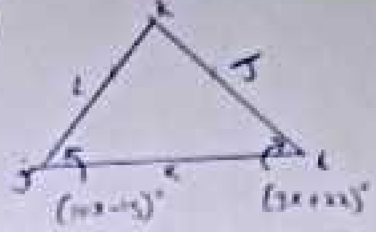
$\frac{11x}{11}=\frac{132}{11}$

$x=12$

$m\angle RTS=(7(12)-6)^\circ$

$=78^\circ$

22)



Isosceles triangle is a triangle which has two equal sides

if side $J=L$. This implies that $m\angle KJL=\angle KLJ$

$10x-13=3x+22$

$10x-3x=22+13$

$\frac{7x}{7}=\frac{35}{7}$

$x=5$

$m\angle J=10(5)-13$

$=37^\circ$

$m\angle L=3(5)+22$

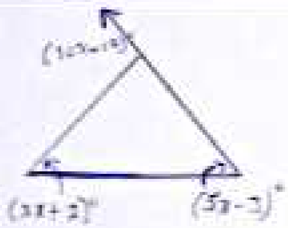
$=37^\circ$

$m\angle JKL=180-(37+37)$

$m\angle JKL=180-74$

$=106$

23)



~~$(5x-3)^\circ=(10x-19)^\circ$ ⇒ Corresponding angles are equal~~

~~$5x-3=10x-19$~~

~~$5x-10x=-19+3$~~

~~$-5x=$~~

$(3x+2)^\circ+(5x-3)^\circ=(10x-19)^\circ$

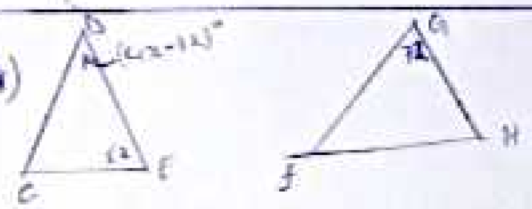
$3x+5x-10x=-19+3-2$

$\frac{-2x}{-2}=\frac{-18}{-2}$

$x=9$

The sum of the two interior angles is equal to the angle that is adjacent to the third angle.

24)



$\triangle CDE\cong\triangle GHF$

$\angle DCE=72$

$5x+72+4x-12=180^\circ$

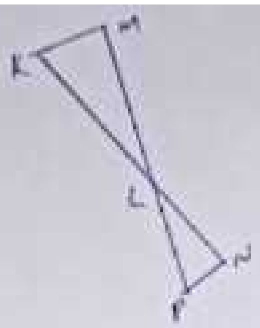
$4x=180-5x-72+12$

$\frac{4x}{4}=\frac{68}{4}$

$x=17$

$x=17$

25)

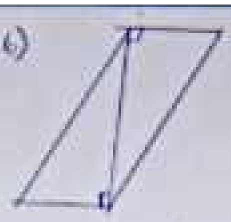


Key: L is the midpoint of $\overline{KN}$ and $\overline{MP}$
to prove that the triangles are equal we use

side-angle-side

This means that we have two triangles where we know two sides and the included angles are equal

26)

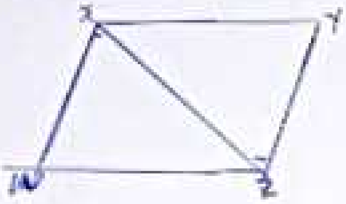


To prove that $\Delta ABC \cong \Delta DCB$ by hypotenuse-leg:

$\overline{AB} \cong CD$

hypotenuse leg means that we have two right-angled triangles with
(i) The same length of hypotenuse and
(ii) The same length for one of the other two legs

27)



$\overline{WX} \cong \overline{YZ}$

$\Delta WXZ \cong \Delta YZX$

$\angle WXZ \cong \angle YZX$

$\angle WZX \cong YXZ$

C. Corresponding Angles

28)

$\overline{XZ} \cong \overline{XZ}$

A. Symmetric property

29)

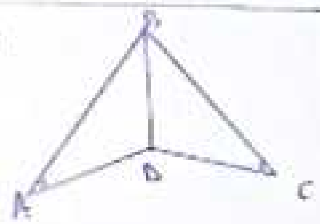
$\Delta WXZ \cong \Delta YZX$

This is justified by

side-angle-side

which implies that we have two triangles where we know two sides and the included angles are equal.

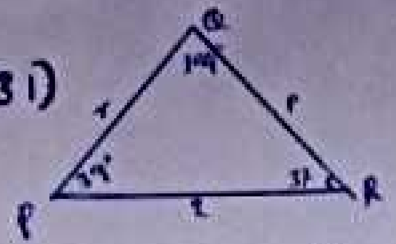
30)



If $\Delta ABD \cong \Delta CBD$, then

$\overline{AB} \cong CB$

31)



$m\angle R = 180 - (39 + 104)$

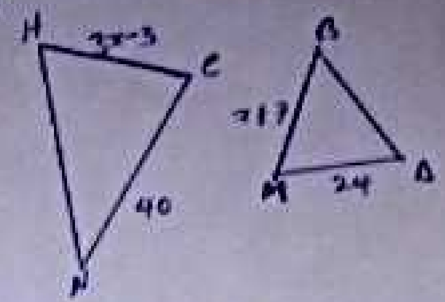
$= 180 - 143$

$= 37$

The list of the sides in order from the greatest to the least is

$\overline{PR}, QR, PQ$

32)



If $\triangle HCN \sim \triangle BMD$

$\frac{40}{24} = \frac{5}{3}$

This implies that

$(3x-3) = \frac{5}{3}(x+7)$

$3x - 3 = \frac{5}{3}x + \frac{35}{3}$

$3x - \frac{5}{3}x = \frac{35}{3} + 3$

$\frac{3}{4} \cdot \frac{4}{3}x = \frac{\cancel{44}^{11}}{\cancel{3}} \times \frac{\cancel{3}}{4}$

$x = 11$