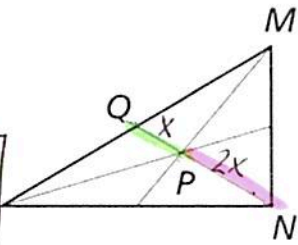


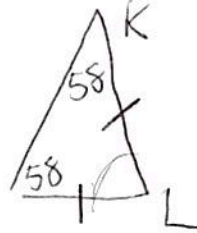
UNKNOWN ANGLES REVIEW #1

1. Point P is the centroid of $\triangle LMN$. If $QN = 42$, Find PN and QP .

$$\begin{aligned} x + 2x &= 42 \\ 3x &= 42 \\ x &= 14 = QP \\ 2x &= 28 = PN \end{aligned}$$



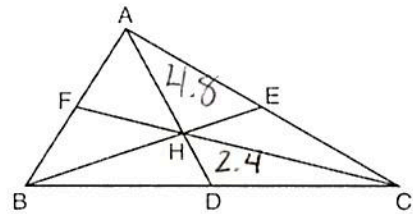
2. In $\triangle JKL$, $\overline{JL} \cong \overline{KL}$. If $m\angle J = 58$, what is $m\angle L$?



$$180 - 58 - 58 = 64^\circ$$

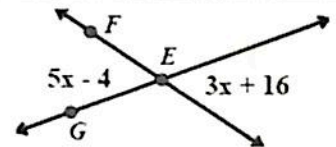
3. In the diagram below of $\triangle ABC$, point H is the intersection of the three medians. If \overline{DH} measures 2.4 centimeters, what is the length, in centimeters, of \overline{AD} ?

$$\begin{aligned} 2.4 \times 2 &= 4.8 \\ 2.4 + 4.8 &= 7.2 = AD \end{aligned}$$



4. Solve for the x.

$$\begin{aligned} 5x - 4 &= 3x + 16 \\ -3x + 4 & \quad -3x + 4 \\ \hline 2x &= 20 \\ x &= 10 \end{aligned}$$



Reason: vertical \angle 's are congruent

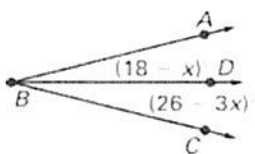
5. If the measures, in degrees, of the three angles of a triangle are x , $x + 10$, and $2x - 6$, the triangle must be

- 1) isosceles
- 2) equilateral
- 3) right
- 4) scalene

$$\begin{aligned} x + x + 10 + 2x - 6 &= 180 \\ 4x + 4 &= 180 \\ 4x &= 176 \\ x &= 44 \end{aligned}$$

$$\begin{aligned} x &= 44 \\ x + 10 &= 54 \\ 2x - 6 &= 82 \end{aligned}$$

6. If \overline{BD} bisects $\angle ABC$, determine the value of $\angle ABC$.



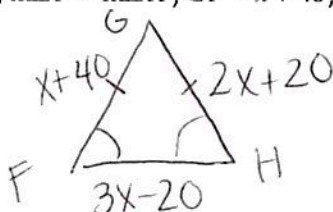
$$\begin{aligned} 18 - x &= 26 - 3x \\ -26 + x & \quad -26 + x \\ \hline -8 &= -2x \\ x &= 4 \end{aligned}$$

$$\begin{aligned} 18 - 4 &= 14 \\ 26 - 3(4) &= 14 \\ \angle ABC &= 14 + 14 = 28^\circ \end{aligned}$$

Reason: A bisector creates 2 \cong \angle 's

7. In $\triangle FGH$, $m\angle F = m\angle H$, $GF = x + 40$, $HF = 3x - 20$, and $GH = 2x + 20$. The length of \overline{GH} is

- 1) 20
- 2) 40
- 3) 60
- 4) 80



isosceles Δ !

$$\begin{aligned} x + 40 &= 2x + 20 \\ -x - 20 & \quad -x - 20 \\ \hline 20 &= x \end{aligned}$$

$$2(20) + 20 = 60 = GH$$

8. Find $m\angle RSQ$ and $m\angle TSQ$.

$$15x - 43 + 8x + 18 = 90$$

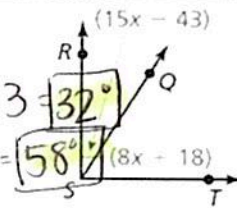
$$23x - 25 = 90$$

$$23x = 115$$

$$x = 5$$

$$m\angle RSQ = 15(5) - 43 = 32^\circ$$

$$m\angle TSQ = 8(5) + 18 = 58^\circ$$



Reason: Complementary \angle 's sum to 90°

9. Given that $\angle KLM$ is a straight angle, find $m\angle KLN$ and $m\angle NLM$.

$$10x - 5 + 4x + 3 = 180$$

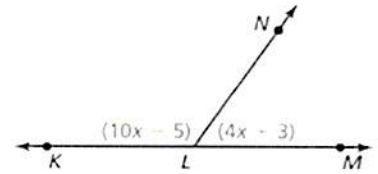
$$14x - 2 = 180$$

$$14x = 182$$

$$x = 13$$

$$m\angle KLN = 10(13) - 5 = 125^\circ$$

$$m\angle NLM = 4(13) + 3 = 55^\circ$$

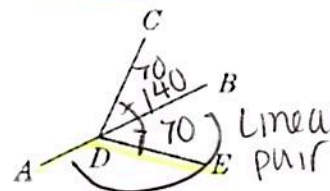


Reason: Linear pairs are supplementary

10. In the diagram, $m\angle CDE = 140$, and $\angle CDE$ is bisected by \overline{AB} . What is the measure of $\angle EDA$?

$$140 \div 2 = 70$$

$$180 - 70 = 110^\circ$$



11. Solve for the missing values.

$$x = 12$$

$$24 = 2x \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{vertical } \angle \text{'s}$$

$$x = 12$$

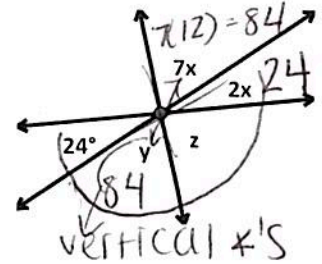
$$y = 84^\circ$$

$$24 + 84 + z = 180 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \angle \text{'s on a line}$$

$$108 + z = 180$$

$$z = 72$$

$$z = 72$$



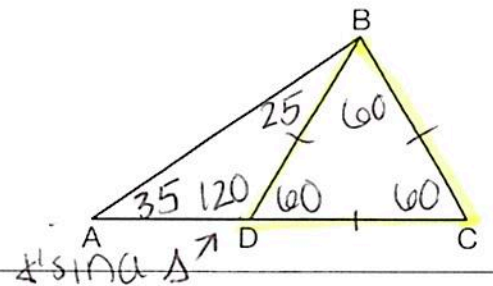
12. In the diagram of $\triangle ABC$ below, \overline{BD} is drawn to side \overline{AC} . If $m\angle A = 35$, $m\angle ABD = 25$, and $m\angle C = 60$, which type of triangle is $\triangle BCD$?

① equilateral

2) scalene

3) obtuse

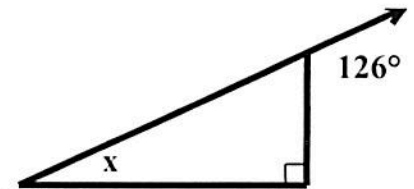
4) right



13. Solve for x.

$$x + 90 = 126$$

$$x = 36^\circ$$

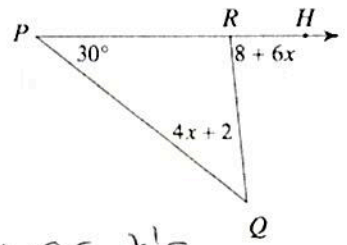


Reason: Exterior \angle of a \triangle sums to two non-adjacent interior \angle 's

14. What is the value of x?

$$\begin{aligned} 30 + 4x + 2 &= 8 + 6x \\ 4x + 32 &= 8 + 6x \\ -4x \quad -8 \quad -8 \quad -4x \\ 24 &= 2x \end{aligned}$$

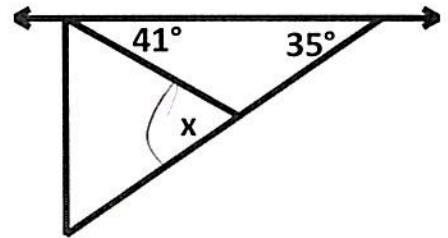
$x = 12$



Reason: exterior \angle = sum of two nonadjacent interior \angle 's

15. Solve for x.

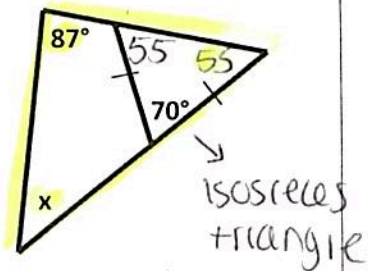
$$\begin{aligned} 41 + 35 &= x \\ 76 &= x \end{aligned}$$



Reason: exterior \angle of a Δ = sum of 2 nonadjacent interior \angle 's

16. Solve for x.

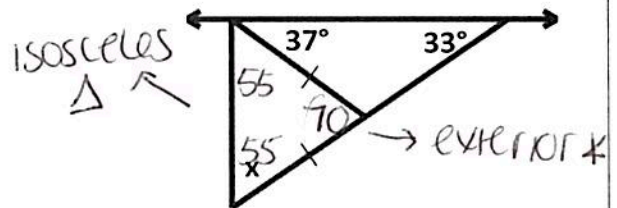
$$\begin{aligned} 87 + 55 &= 142 \\ 180 - 142 &= 38^\circ = x \end{aligned} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} \angle \text{'s in a } \Delta \\ \end{array}$$



Reason: isosceles Δ 's have 2 \cong base \angle 's + \angle 's in a Δ sum to 180

17. Solve for x.

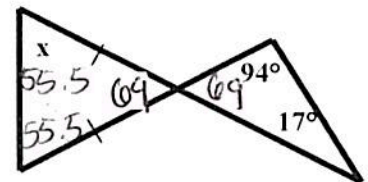
$$\begin{aligned} 37 + 33 &= 70 \\ 180 - 70 &= 110 \\ 110 \div 2 &= 55 = x \end{aligned}$$



Reason: exterior \angle of a Δ = sum of 2 nonadjacent int. \angle 's + isosceles Δ 's have 2 \cong base \angle 's

18. Solve for x.

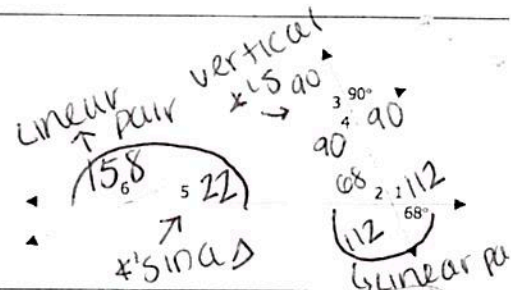
$$\begin{aligned} 94 + 17 &= 111 \\ 180 - 111 &= 69 \\ 111 \div 2 &= 55.5 = x \end{aligned} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} \text{isosceles } \Delta \\ \end{array}$$



Reason: \angle 's in a Δ sum to 180, vertical \angle 's are \cong and isosceles triangles have 2 \cong base \angle 's

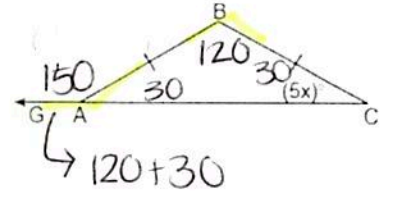
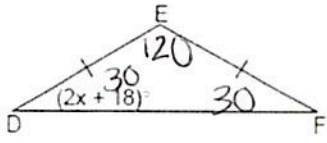
19. Solve for the missing angles.

1 = 112° 4 = 90°
 2 = 68° 5 = 22°
 3 = 90° 6 = 158°



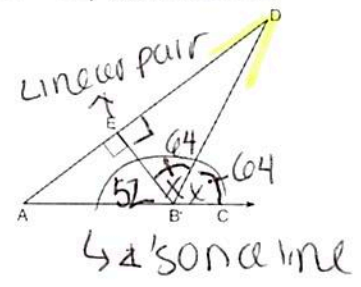
20. In the accompanying diagram, isosceles $\triangle ABC \cong$ isosceles $\triangle DEF$, $m\angle C = 5x$, and $m\angle D = 2x + 18$. Find $m\angle B$ and $m\angle BAG$.

$2x + 18 = 5x$ $5(6) = 30$
 $18 = 3x$ $2(6) + 18 = 30$
 $x = 6$ $\angle B = 120$
 $\angle BAG = 150$



21. The diagram below shows $\triangle ABD$, with \overline{ABC} , $\overline{BE} \perp \overline{AD}$, and $\angle EBD \cong \angle CBD$. If $m\angle ABE = 52$, what is $m\angle D$?

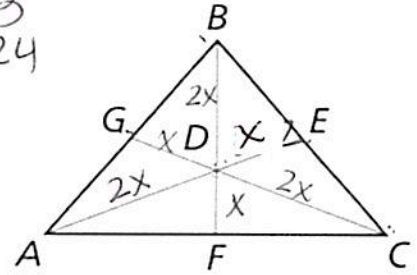
$52 + x + x = 180$ $90 + 64 = 154$
 $2x = 128$ $180 - 154 = 26^\circ$
 $x = 64$ $\angle D = 26^\circ$



22. Point D is the centroid of $\triangle ABC$. Use the given information to find the value of x for each of the following:

I. $GD = 2x - 8$ and $GC = 3x + 3$
 $2x - 8 + 2(2x - 8) = 3x + 3$
 $2x - 8 + 4x - 16 = 3x + 3$

$6x - 24 = 3x + 3$
 $-3x + 24 = -3x + 24$
 $3x = 27$
 $x = 9$

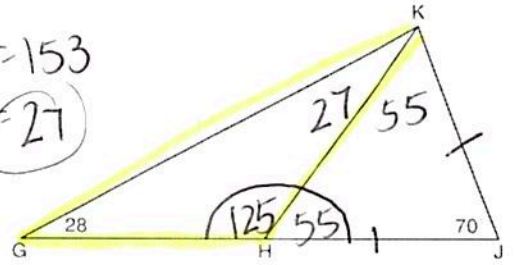


II. $AD = 5x$ and $DE = 3x - 2$
 $2(3x - 2) = 5x$
 $6x - 4 = 5x$
 $-4 = -x$
 $x = 4$

III. $DF = 4x - 1$ and $BD = 6x + 4$
 $2(4x - 1) = 6x + 4$
 $8x - 2 = 6x + 4$
 $2x = 6$
 $x = 3$

23. In the diagram below of $\triangle GJK$, H is a point on \overline{GJ} , $\overline{HJ} \cong \overline{JK}$, $m\angle G = 28$, and $m\angle GJK = 70$. Determine whether $\triangle GHK$ is an isosceles triangle and justify your answer.

$180 - 70 = 110$ $180 - 55 = 125$ $28 + 125 = 153$
 $110 \div 2 = 55$ $180 - 153 = 27$



$\triangle GHK$ is NOT isosceles b/c no 2 \angle 's are \cong