Secondary Math 2 Honors Name______________________

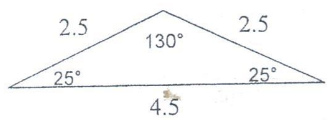
Introduction to Triangles Notes

Date______________ Period_____

Classify each triangle by its angles (acute, right, obtuse) and sides (scalene, isosceles, equialteral).

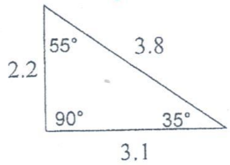
acute: $>90°$ right: $=90°$ obtuse: $<90°$ scalene: No sides $\cong$ isosceles: 2 sides $\cong$ equilateral: all 3 sides $\cong$

1)



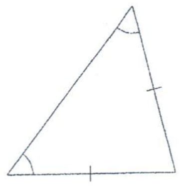
obtuse isosceles

2)



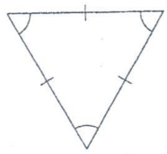
right scalene

3)



acute isosceles

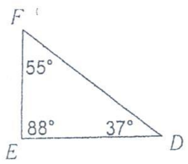
4)



acute equilateral

Order the sides of each triangle from shortest to longest. → angles will be from least to greatest

5)

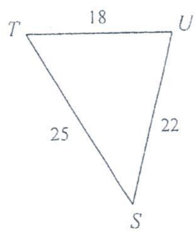


37°, 55°, 88°

$\boxed{\overline{EF} < \overline{DE} < \overline{DF}}$

Order the angles in each triangle from smallest to largest. → sides will be shortest to longest

6)



18 < 22 < 25

$\boxed{\angle S < \angle T < \angle U}$

State if the three numbers can be the measures of the sides of a triangle. → $a<b+c$, $b<a+c$, $c<a+b$

7) 11, 11, 2 $11<11+2$ ✓ $11<11+2$ ✓ $2<11+11$ ✓ $\boxed{\text{Yes!}}$

8) 11, 3, 8 $11<3+8$ No! $\boxed{\therefore \text{Not a triangle}}$

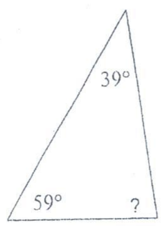
Two sides of a triangle have the following measures. Find the range of possible measures for the third side.

9) 11, 7 $c<11+7$ $c<18$ $11>7+c$ $4>c$ $\boxed{\therefore\ 4>c>18}$

10) 7, 10 $c<7+10$ $c<1$ $10>7+c$ $3>c$ $\boxed{\therefore\ 3>c>17}$

Find the measure of each angle indicated. ↳ All angles in a triangle = 180°

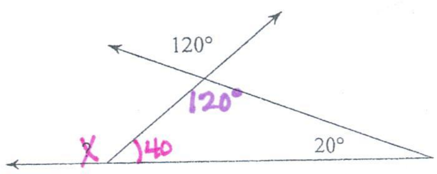
11)



$180-(39+59)$

$\boxed{=82°}$

12)

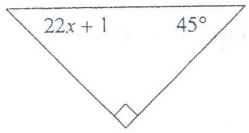


$180-(120+20)$

$\boxed{=40°}$ → $x=180-40$ $\boxed{X=140}$

Solve for x.

13)

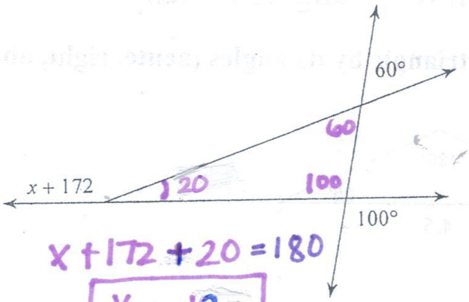


$45 = 22x + 1$

$\frac{44}{22} = \frac{22x}{22}$

$\boxed{x = 2}$

14)

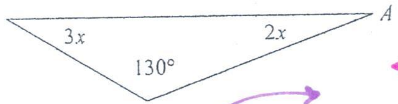


$x + 172 + 20 = 180$

$\boxed{x = -12}$

Find the measure of angle A.

15)



$3x + 2x + 130 = 180$

$5x = 50$

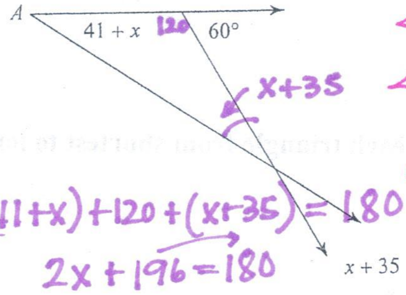
$\boxed{x = 10}$

$\angle A = 2x$

$\angle A = 2(10)$

$\boxed{\angle A = 20°}$

16)



$\angle A = 41 + x$

$\angle A = 41 + (-8)$

$\boxed{\angle A = 33}$

$(41 + x) + 120 + (x + 35) = 180$

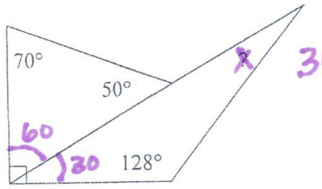
$2x + 196 = 180$

$2x = -16$

$\boxed{x = -8}$

Find the measure of each angle indicated.

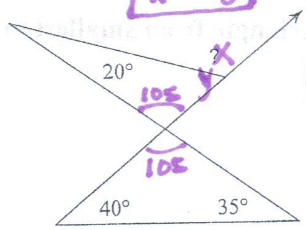
17)



$30 + 128 + x = 180$

$\boxed{x = 22°}$

18)



$105 + 20 + y = 180$

$y = 55$

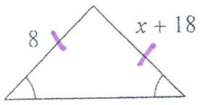
$x + y = 180$

$x + 55 = 180$

$\boxed{x = 125°}$

Find the value of x.

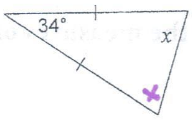
19)



$8 = x + 18$

$\boxed{-10 = x}$

20)

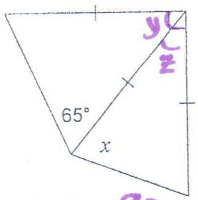


$34 + 2x = 180$

$2x = 146$

$\boxed{x = 73°}$

21)



$y + z = 90$

$50 + z = 90$

$z = 40$

$65° + 65° + y = 180$

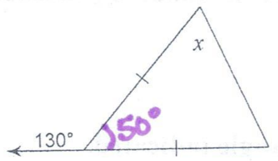
$y = 50$

$2x + 40 = 180$

$2x = 140$

$\boxed{x = 70°}$

22)



$50 + 2x = 180$

$2x = 130$

$\boxed{x = 65°}$

Ratios & Proportions (Section 10-1)

* **Ratio:** compares two quantities, written as: $\frac{a}{b}$ or $a:b$ or a to b.

  * must be <u>same</u> units!

#1
ex: tennis racket: 2 ft 4 in = 16 in
paddle: 10 in

$2\text{ft} = 24\text{in}$
$+4\text{in}$
28in

ratio: $\frac{28}{10} = \boxed{\frac{17}{5}}$

#2
ex: table tennis ball: 40 mm
tennis ball: 6.8 cm

$6.8\text{cm} = 68\text{mm}$

ratio: $\frac{40}{68} = \boxed{\frac{10}{17}}$

Got it?
ex: 2 supplementary angles ratio 1:4. What are the angles?

$x + 4x = 180$
$5x = 180$
$x = \boxed{36°} \rightarrow 4x = \boxed{144°}$

#3
ex: played 154 games, ratio $\frac{5}{2}$ won / lost.

$\frac{5 \text{ won}}{7 \text{ total}}$

Proportion

* $\frac{x}{154} = \frac{5}{7}$

$7x = 770$
$x = 110$ won, 44 lost

OR $5x + 2x = 154$
$7x = 154$ $x = 22$

won: 110
lost: 44

Got it?
ex: 4:7:9, perimeter = 60 cm

$4x + 7x + 9x = 60$
$20x = 60$
$x = 3 \rightarrow \boxed{\text{lengths: } 12, 21, 27 \text{ cm}}$

#6
ex: 4:3:2 ratio of angles of a triangle. Largest angle?

$4x + 3x + 2x = 180$
$9x = 180$
$x = 20 \rightarrow \boxed{\text{largest angle} = 80°}$

* **Proportion:** an equation that states two ratios are equivalent.

$\frac{a}{b} = \frac{c}{d}$ * cross multiply $\rightarrow a \cdot d = b \cdot c$

ex: $\frac{9}{2} = \frac{a}{14}$

$\frac{9 \cdot 14}{2} = \frac{2a}{2}$

$\boxed{a = 63}$

ex: $\frac{15}{m+1} = \frac{3}{m}$

$15m = 3(m+1)$
$15m = 3m + 3$
$12m = 3$
$\boxed{m = 1/4 \text{ or } .25}$

ex: $\frac{n+4}{8} = \frac{n}{4}$

$4(n+4) = 8n$
$4n + 16 = 8n$
$16 = 4n$
$\boxed{n = 4}$

* Writing equivalent proportions:

- If $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$

- If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$

- If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{b} = \frac{c+d}{d}$

ex: $\frac{x}{6} = \frac{y}{7} \rightarrow \frac{6}{x} = \frac{7}{y}$

$\rightarrow \frac{y+7}{7} = \frac{x+6}{6}$

ex: $\frac{a}{b} = \frac{3}{4} \rightarrow 4a = 3b$

$\rightarrow \frac{a+b}{b} = \frac{3+4}{4}$