Unit 4 - Congruence Study Guide

(1) 180°

(2) The exterior angle of a triangle is equal to the sum of the two opposite interior angles of the triangle.

(a) $x = 21 + 34$

$\boxed{x = 55}$

(b) $100 = 2x + 3 + 51$

$46 = 2x$

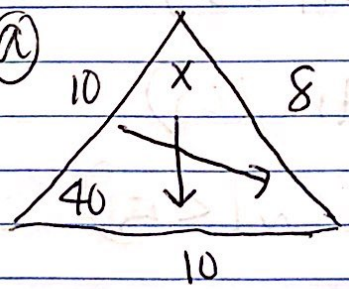
$\boxed{x = 23}$

(3) An isosceles triangle has two sides that are congruent.

(4) If two sides of a triangle are congruent, then the angles opposite those sides are congruent.

(5) If two angles of a triangle are congruent then the sides opposite those angles are congruent

(a)

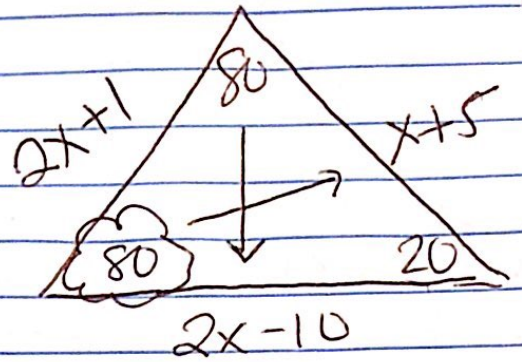


$180 = 40 + x + x$

$140 = 2x$

$\boxed{x = 70}$

(b)



$180 - 80 - 20 = 80$

$x + 5 = 2x - 10$

$x + 15 = 2x$

$15 = x$

(6)

a) Alt Int.

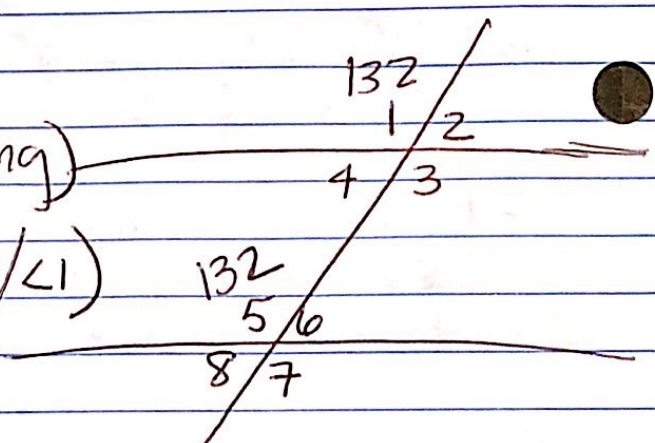
b) Alt Ext.

c) Corresponding

d) Vertical Angles

e) Linear Pair

(7)



$m\angle 1 = 132$ (corresponding)

$m\angle 2 = 48$ (Linear Pair w/ $\angle 1$)

$m\angle 3 = 132$ (Alt Int)

$m\angle 4 = 48$ (same side Int = 180)

$m\angle 6 = 48$ (Linear Pair w/ $\angle 5$)

$m\angle 7 = 132$ (Vertical Angles)

$m\angle 8 = 48$ (Linear Pair w/ $\angle 5$)

(8) $m\angle 1 = 2x+4 \quad m\angle 7 = 3x-7$

$\angle 1$ & $\angle 7$ are Alt Ext which are congruent.

don't forget the second part

$2x+4 = 3x-7$

$2x+11 = 3x$

$11 = x$

Find $\angle 6$ ← linear pair with angle 7.

$180 = m\angle 7 + m\angle 6$

$m\angle 7 = 3(11)-7 = 26$

$180 = 26 + m\angle 6$

$m\angle 6 = 154$

(9) congruent

(a) $\triangle ABC \cong \triangle PQR$

$4y-13 = 2y+x$

$-2y \qquad -2y$

$2y-13 = x$

Find PQ

$2x+4$

We have x's & y's since PQ is in terms of x, we solve for x & then plug in.

9

(a) Cont

$AB = x + y$
$PQ = 2x + 4$

$\triangle ABC \cong \triangle PQR$

$x + y = 2x + 4$

$(2y - 13) + y = 2(2y - 13) + 4$

$3y - 13 = 4y - 26 + 4$
$3y - 13 = 4y - 22$
$3y + 9 = 4y$
$\boxed{9 = y}$

Now find x

$x = 2(9) - 13 = 5$

$PQ = 2(5) + 4 = 14$ $\boxed{PQ = 14}$

Online version

*You could have taken another route, but you should get that $PQ = 14$.

(b) $\triangle \boxed{L}M\boxed{N} \cong \triangle X\boxed{Y}Z$ ← given parts. Angles should sum to 180.

$(x + 50) + (40) + (-2x + 10) = 180$

$-x + 100 = 180$
$-x = 80$
$x = -80$

$m\angle X = x + 50$
$-80 + 50$
$\boxed{m\angle X = -30}$

You won't get this on test

Class Version

(9b) After change to make Positive

$x+50+40+2x+30=180$

$3x+120=180$

$3x=60$

$x=20$

$m\angle X = 70$

$m\angle X = x+50$

$m\angle X = 20+50 = 70$

(10) SSS, HL, SAS, ASA, AAS, SAA

rewrite in other direction still works

(11) ~~AAA~~ (no roadside assistance!)

ASS, SSA (NO Donkey!)

(12) a) ~~ASA~~ $\triangle PQR$

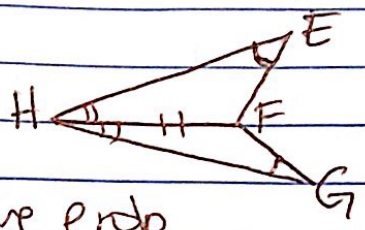
b) ~~AAS~~, $\triangle QPR$

c) SSS, $\triangle RPQ$

d) HL, $\triangle RQP$

e) SAS, $\triangle PQR$

13a) Given $\angle E \cong \angle G$ $\overline{HF}$ bisects $\angle EHG$
Prove: $\overline{HE} \cong \overline{HG}$



Given: $\angle E \cong \angle G$

Given: $\overline{HF}$ bisects $\angle EHG$

Reflexive prop: $\overline{HF} \cong \overline{HF}$

↓ def of bisects

$\angle EHF \cong \angle FHG$

↓ by AAS

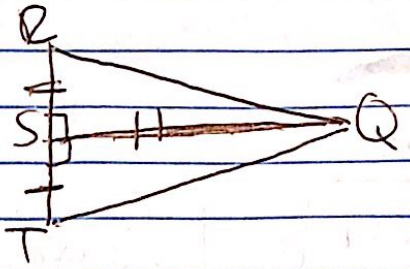
$\triangle EHF \cong \triangle GHF$

↓ CPCTC

$\overline{HE} \cong \overline{HG}$

(13)b) Given $\overline{RS} \cong \overline{TS}$, $SQ \perp RT$

Prove $\triangle RSQ \cong \triangle TSQ$



Given: $\overline{RS} \cong \overline{TS}$

Given: $SQ \perp RT$

Reflexive Prop: $\overline{SQ} \cong \overline{SQ}$

↓ def of $\perp$

$\angle RSQ$ & $\angle QST$ are Right

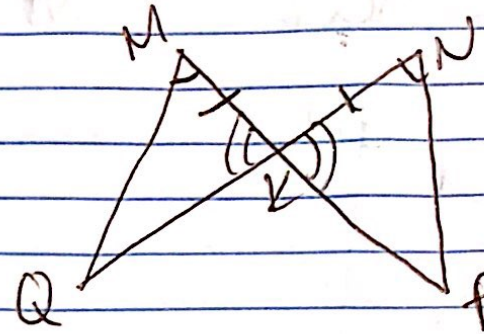
↓ def of Right $\angle$

$\angle RSQ \cong \angle QST$

↓ SAS

$\triangle RSQ \cong TSQ$

13c) Given $\angle MQ \cong \angle KNP$,
$\overline{MK} \cong \overline{NK}$
Prove $\triangle MQK \cong \triangle NPK$



Given
$\angle MQ \cong \angle KNP$

Given
$\overline{MK} \cong \overline{NK}$

Vertical $\angle$s
$\angle MKQ \cong \angle NKP$

ASA

$\triangle MQK \cong \triangle NPK$