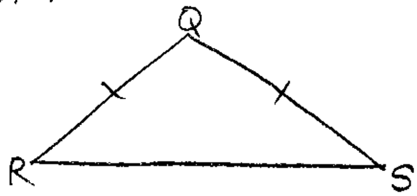
2.3 Foundations of Math 11

p. 90 #4–16

4.

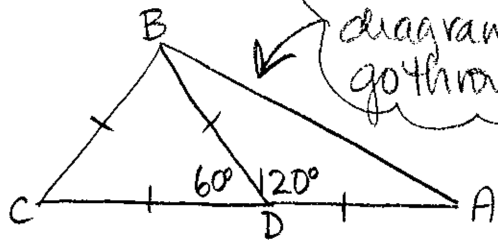


Since this is an isosceles triangle, $\angle R$ and $\angle S$ are equal so...

$\angle R = \dfrac{180° - \angle Q}{2}$ ← subtract $\angle Q$ ← divide by 2 because there is 2 angles: R & S

5.

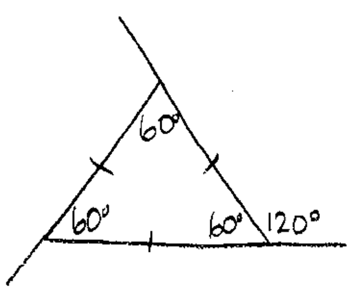
add info to the diagram as you go through the proof



Prove: $\angle A = 30°$

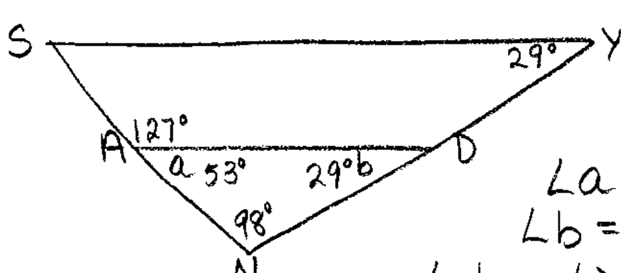
Statement	Justification
$\triangle BCD$ is equilateral	given
$\angle BDC = 60°$	definition of equilateral triangle
$\angle BDA = 120°$	supplementary to $\angle BDC$
$BD = AD$	given
$\angle BAD = \angle ABD$	opposite equal sides of isosceles triangle
$\angle BAD = 30°$	angle sum of a triangle is 180°

6.



- angles of an equilateral triangle is 60°
- each exterior angle is $180° - 60° = 120°$
- sum of all exterior angles $= 120°(3) = 360°$

7.



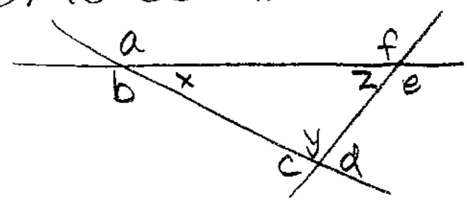
Prove: $SY \parallel AD$

$\angle a = 180° - 127° = 53°$

$\angle b = 180° - 53° - 98° = 29°$

$\angle b = \angle Y$ and they are corresponding so $SY \parallel AD$

p. 90 cont.

8. 

a) $\angle a + \angle c + \angle e = 360°$

b) Yes, it does because $\angle a = \angle b$, $\angle c = \angle d$, $\angle e = \angle f$ so $\angle b + \angle d + \angle f = 360°$

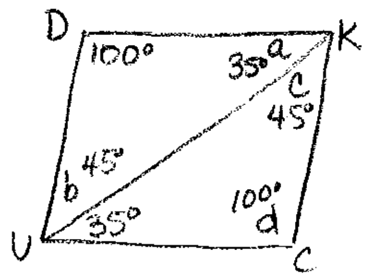
c)
$$\begin{aligned} x &= 180° - a \\ y &= 180° - c \\ z &= 180° - e \\ \hline x + y + z &= 540° - a - c - e \end{aligned}$$

add all three equations together

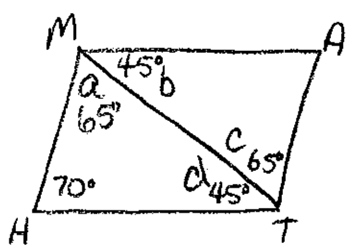
$x + y + z = 180°$ because they are the angles in one triangle

$$180° = 540° - a - c - e$$
$$a + c + e + 180° = 540°$$
$$a + c + e = 360°$$

9. a) In the third line "$\angle UDK = \angle DUC$" is incorrect – they are not corresponding angles.

b) 

$\angle a = 35°$ alternate interior to 35°
$\angle b = 45°$ angle sum in ΔDUK
$\angle c = 45°$ alternate interior to $\angle b$
$\angle d = 100°$ angle sum in ΔKCU

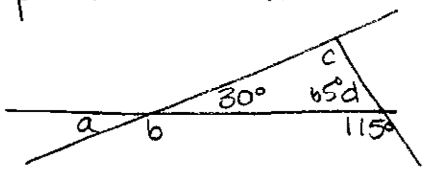
10. 

Prove MATH is a parallelogram

$\angle a = 65°$ angle sum in ΔMHT
$\angle b = \angle d$ both 45°
$MA \parallel HT$ alternate interior angles are equal
$\angle a = \angle c$ both 65°
$MH \parallel AT$ alternate interior angles are equal
MATH is a parallelogram 2 sets of parallel lines

p. 90 cont.

11.



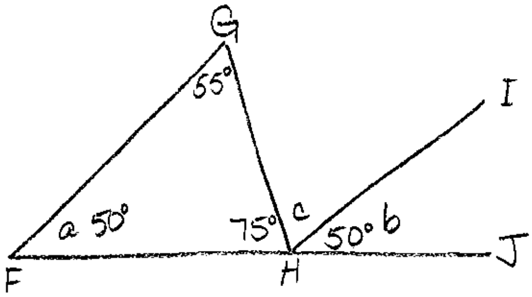
$\angle d = 65°$ supplementary to $115°$

$\angle c = 85°$ angle sum in Δ

$\angle a = 30°$ vertically opposite $30°$

$\angle b = 150°$ supplementary to $30°$

12.



a) $\angle a = 50°$ angle sum in ΔFGH

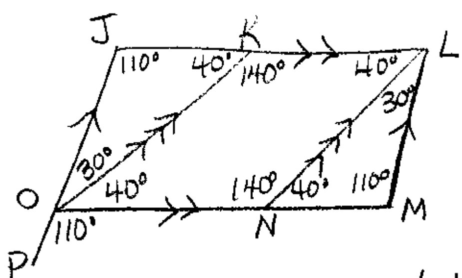
$\angle a = \angle b$ both $50°$

$GF \parallel HI$ corresponding angles are equal

I disagree

b) I did it an alternate method in a). To do it Tim's way:
$\angle c = 180° - 75° - 50° = 55°$. So $\angle FGH = \angle IHJ$. That
was Tim's error.

13.



$\angle J = 110°$ corresponding to $110°$

$\angle KON = 40°$ interior angles same side trans. to $140°$

$\angle JOK = 30°$ supplementary to $\angle KOP$

$\angle JKO = 40°$ angle sum ΔJKO

$\angle KLN = 40°$ corresponding to $\angle JKO$

$\angle LNO = 140°$ angle sum quadrilateral $KLNO$

$\angle LNM = 40°$ supplementary to $\angle LNO$

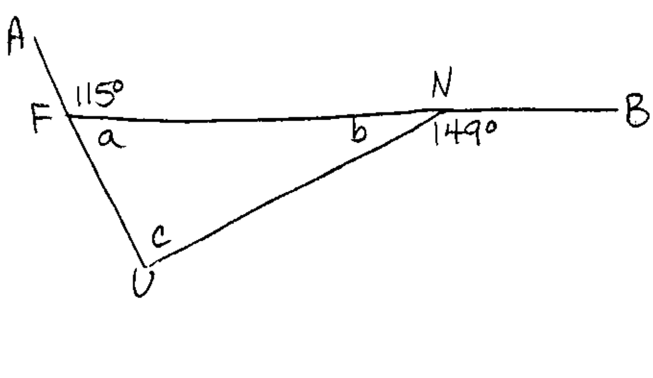
$\angle M = 110°$ alternate interior to $110°$

$\angle MLN = 30°$ angle sum ΔLMN

$\angle JON = 70°$ $\angle JOK + \angle KON$

$\angle KLM = 70°$ $\angle KLN + \angle NLM$

14.



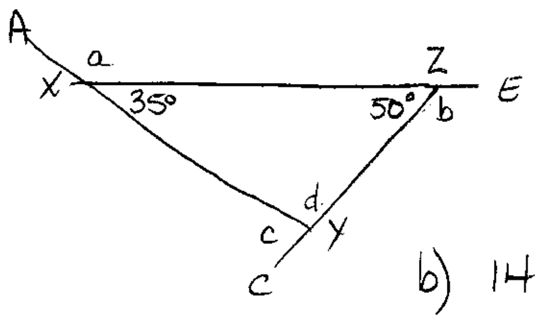
$\angle a = 65°$ supplementary to $115°$

$\angle b = 31°$ supplementary to $149°$

$\angle c = 84°$ angle sum of ΔFUN

p. 90 cont.

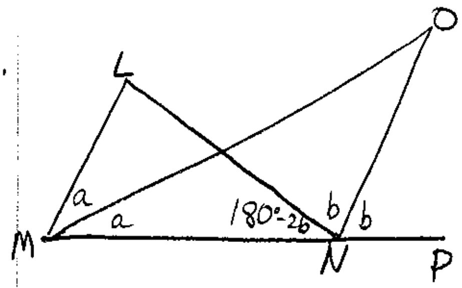
15.



a) $\angle a = 145°$ supplementary to 35°
$\angle b = 130°$ supplementary to 50°
$\angle d = 95°$ angle sum ΔXYZ
$\angle c = 85°$ supplementary to $\angle d$

b) $145° + 130° + 85° = 360°$

16.



MO and NO are angle bisectors
Prove: $\angle L = 2\angle O$

Statement	Justification
$\angle LNM = 180° - 2b$	supplementary angles
$\angle L = 180° - (180° - 2b) - 2a$	angle sum ΔLMN
$\angle L = \cancel{180°} - \cancel{180} + 2b - 2a$	
$\angle L = 2b - 2a$	
$\angle L = 2(b - a)$	
$\angle O = 180° - a - (180 - 2b) - b$	angle sum ΔOMN
$\angle O = \cancel{180°} - a - \cancel{180°} + 2b - b$	
$\angle O = -a + b$	
$\angle O = b - a$	
$\angle L = 2\angle O$	$\angle L = 2(b-a)$, $\angle O = b - a$