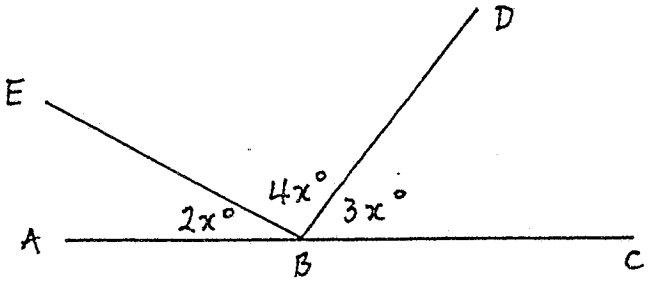
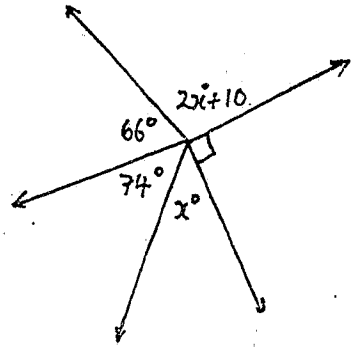
Give full reasons for all your solutions.

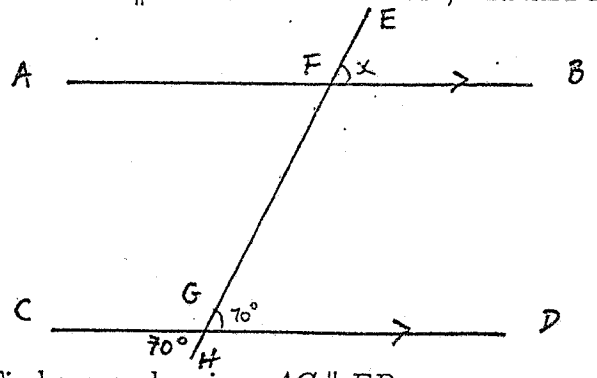
1. (a) ABC is a straight line. Find x.



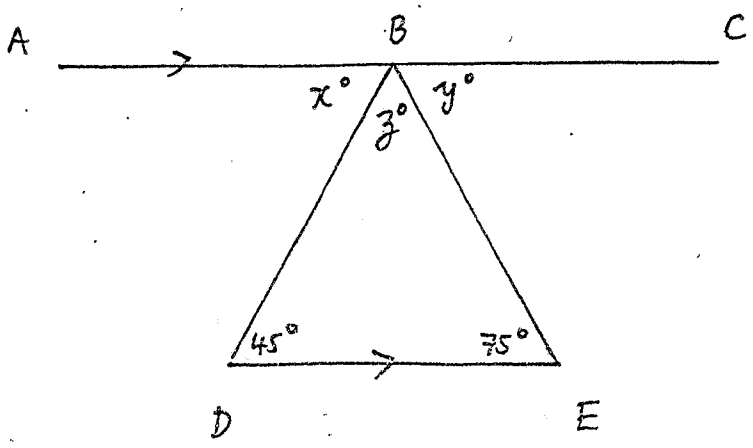
(b) Find x.



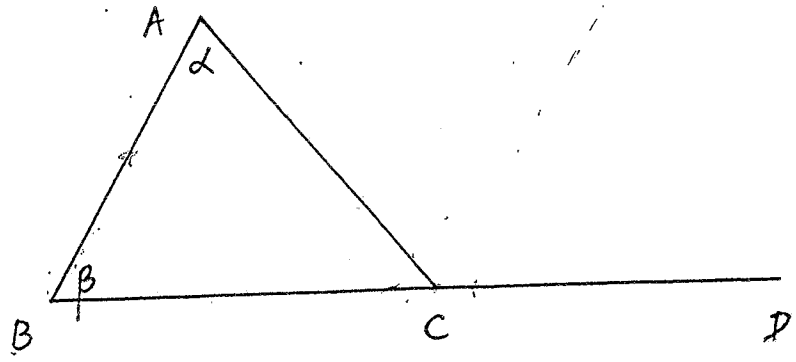
(c) Given $AB \parallel CD$ and $\angle CGH = 70°$, find $\angle EFB$.



(d) Find x, y and z given $AC \parallel ED$.

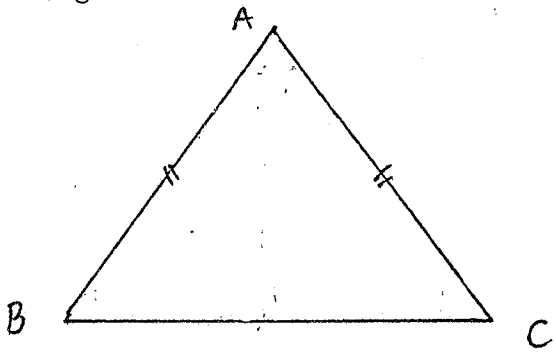


2. Complete a proof of the Exterior Angle of a Triangle Theorem.
ABC is a triangle with side BC produced to D. Let $\angle A = \alpha$ and $\angle B = \beta$.



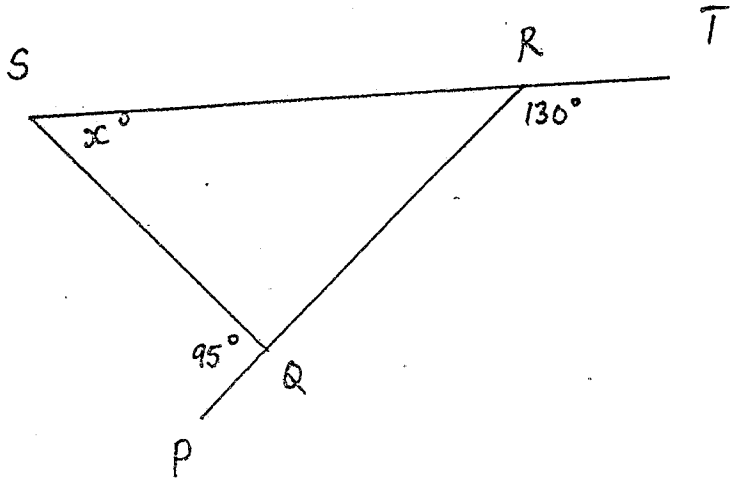
AIM: To prove $\angle ACD = \alpha + \beta$.
CONSTRUCTION: ...
PROOF: ...

3. Prove the base angles of an isosceles triangle are equal. Complete:



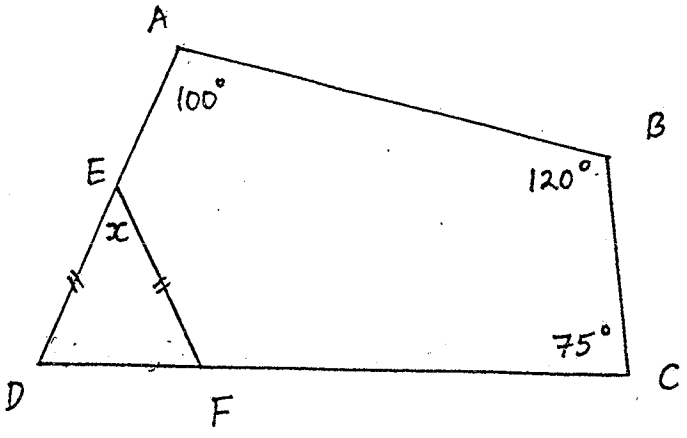
ABC is a triangle with $AB = AC$.
AIM: To prove $\angle B = \angle C$.
CONSTRUCTION: Let the bisector of $\angle A$ meet BC at X.
PROOF: In triangles...

4. (a)



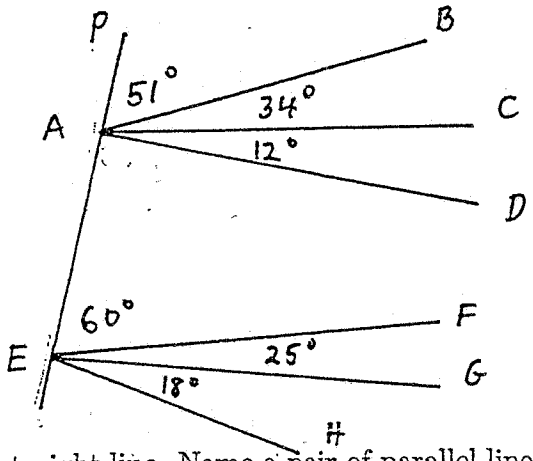
Find x.

(b)



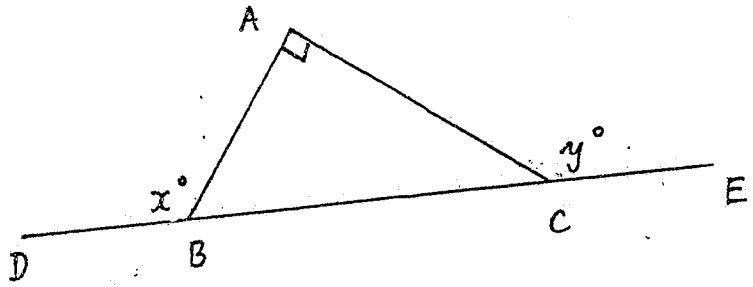
Find x.

5.



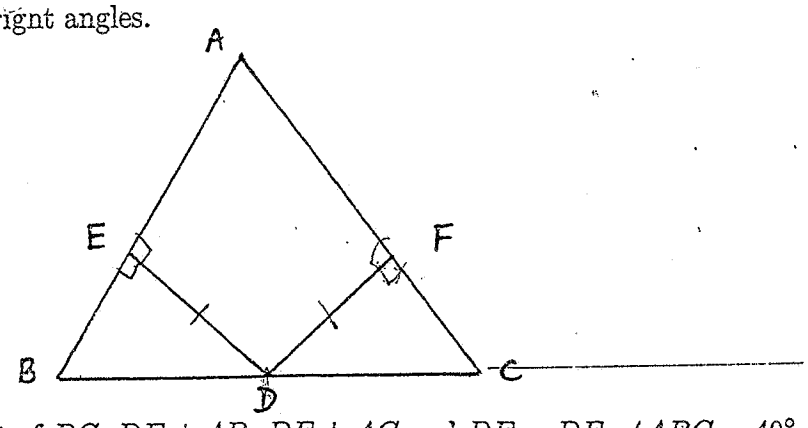
PAE is a straight line. Name a pair of parallel lines giving reasons.

6.



Prove $x + y = 3$ right angles.

7.



D is the midpoint of BC, $DE \perp AB$, $DF \perp AC$ and $DE = DF$. $\angle ABC = 40°$.

(a) Prove $\triangle DEB \equiv \triangle DFC$.

(b) Hence find $\angle C$.

2B – GEOMETRY I – SOLUTIONS

1. (a) $2x + 4x + 3x = 180$ (straight angle) ✓

$9x = 180$

$x = 20$ ✓

(b) $2x + 10 + 90 + x + 74 + 66 = 360$ (revolution) ✓

$3x = 360 - 240$

$3x = 120$

$x = 40$ ✓

(c) $\angle FGD = 70°$ (vertically opposite angles) ✓

$\angle EFB = 70°$ (corresponding angles, $AB \parallel CD$) ✓

(d) $x = 45$ (alt. $\angle$'s, $AC \parallel DE$) ✓

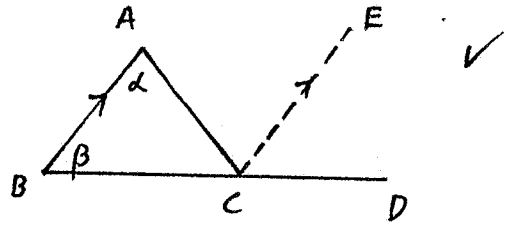
$y = 75$ (alt. $\angle$'s, $AC \parallel DE$) ✓

$z = 180 - 120$ (∠sum of $\triangle BDE$) ✓

$= 60$

9

2. Construction: construct $CE \parallel AB$



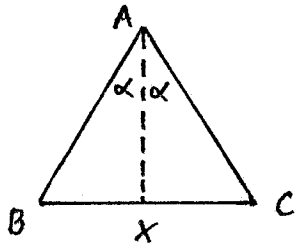
✓

$\angle ACE = \alpha$ (alt. $\angle$s, $AB \parallel CE$) ✓

$\angle ECD = \beta$ (corresp. $\angle$'s, $AB \parallel CE$) ✓

$\therefore \angle ACD = \alpha + \beta$ (adjacent $\angle$'s)

3.



In $\triangle$s AXB and AXC

AX is common

$\angle BAX = \angle CAX$ (AX is the bisector of $\angle A$)

$AB = AC$ (given) ✓

✓

$\therefore \triangle AXB \equiv \triangle AXC$ (SAS)

$\angle B = \angle C$ (matching $\angle$'s of congruent $\triangle$'s) ✓

6

4. (a) $\angle SQR = 180° - 95°$ (straight $\angle$) ✓
$= 85°$

$x° + 85° = 130°$ (exterior $\angle$ of ΔSRQ) ✓
$x° = 45°$
$x = 45$

(b) $\angle ADF = 360° - 120° - 100° - 75°$ ($\angle$ sum of quad ABCD)
$= 65°$ ✓
$\angle EFD = 65°$ (base $\angle$'s of isosceles ΔEDF) ✓
$x° = 180° - 130°$ ($\angle$ sum of ΔEDF) ✓
$x = 50$

5. $\angle PAC = 51° + 34°$ (adjacent $\angle$'s)
$= 85°$

$\angle PEG = 60° + 25°$ (adjacent $\angle$'s)
$= 85°$

$\therefore$ $AC \parallel EG$ (equal corresponding $\angle$'s) ✓✓

6. $\angle ABC = 180° - x$ (straight $\angle$) ✓

$y = 90° + 180° - x$ (ext. $\angle$ of ΔABC) ✓

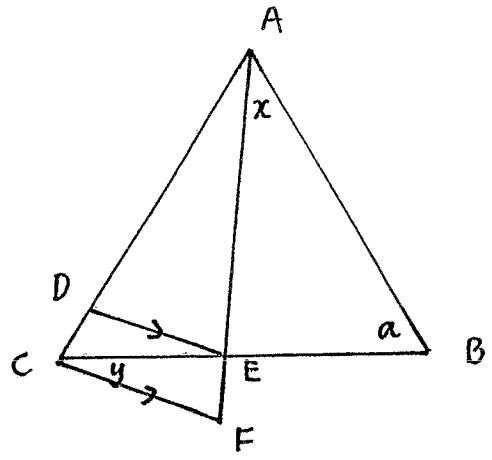
$x + y = 270°$ ✓

7. (a) In Δs DEB and DFC
$DE = DF$ (given) ✓
$\angle BED = \angle CFD = 90°$ (given) ✓
$BD = CD$ (given D is midpoint of BC)

$\therefore$ $\Delta DEB \equiv \Delta DFC$ (RHS) ✓

(b) $\angle C = 40°$ (matching $\angle$s of congruent Δs) ✓

8.



let $\angle ABC = a$

$\angle ACB = a$ (base $\angle$'s of isosceles ΔABC)

$\angle DEC = y$ (alt $\angle$'s, $DE \parallel CF$) ✓

$\angle ADE = a + y$ (exterior $\angle$ of ΔDEC)

$\angle AED = a + y$ (base $\angle$'s of isos ΔADE) ✓

$\angle AEC = x + a$ (exterior $\angle$ of ΔAEB) ✓

$a + y + y = x + a$

$a + 2y = x + a$

$x = 2y$ as required.

/3

TOTAL /32

TCW