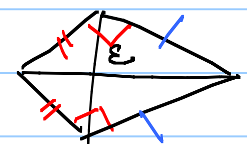
Note Title 11/12/2015

4.4 : 15

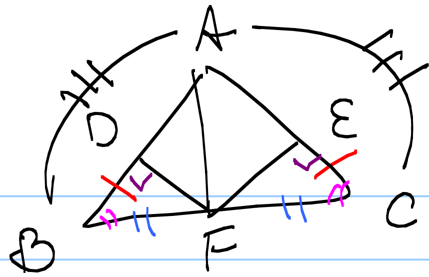


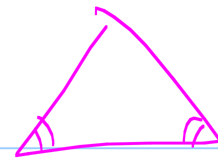
G: ∠ADC & ∠ABC rt ∠s
$\overline{AB} \cong \overline{AD}$

C: $\overleftrightarrow{AC}$ ⊥ bis $\overline{BD}$

S	R
rt 1. ∠ADC & ∠ABC rt ∠s	1. Given
L 2. $\overline{AB} \cong \overline{AD}$	2. Given
H 3. $\overline{AC} \cong \overline{AC}$	3. ref
4. △ADC ≅ △ABC	4. HL (132)
5. $\overline{DC} \cong \overline{BC}$	5. CPCTC
6. $\overleftrightarrow{AC}$ ⊥ bis $\overline{DB}$	6. = dist ⇒ ⊥ bis (35)

17. G: F mdpt $\overline{BC}$
$\overline{DB} \cong \overline{EC}$
$\overline{DB} \perp \overline{DF}$
$\overline{EC} \perp \overline{EF}$
C: $\overleftrightarrow{AF} \perp \overleftrightarrow{BC}$





S	R
1. F mdpt $\overline{BC}$	1. Given
2. $\overline{BF} \cong \overline{FC}$	2. mdpt ⇒ 2 ≅ segs
3. $\overline{DB} \cong \overline{EC}$	3. Given
4. $\overline{DB} \perp \overline{DF}$ & $\overline{EC} \perp \overline{EF}$	4. Given
5. ∠BDF & ∠CEF rt∠s	5. ⊥ ⇒ rt ∠s
6. △BDF ≅ △CEF	6. HL (5, 2, 3)
7. ∠B ≅ ∠C	7. CPCTC
8. $\overline{AB} \cong \overline{AC}$	8. △ ⇒ △
9. $\overleftrightarrow{AF} \perp \overleftrightarrow{BC}$	9. = dist ⇒ ⊥ bis

7 Using the midpoint theorem, x-coordinate of mdpt $\overline{OA}$ is 6, x-coordinate of mdpt $\overline{AB}$ is 10. It is 4 greater.

8 If $\overleftrightarrow{PA} \perp \overleftrightarrow{TS}$, then $m(\overleftrightarrow{PA}) = \frac{1}{-m(\overleftrightarrow{TS})}$

$m(\overleftrightarrow{PA}) = \frac{1-1}{16-2} = 0$ (horizontal)

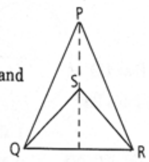
$\therefore \overleftrightarrow{TS}$ is a vertical line. S is at (6.82, 1).

9 x-coordinate is slid 11 – 5 = 6 units.
y-coordinate is unchanged.
New coordinates of P are (15, 3).

10 a $(2x - 8) + (x + 41) = 180$
$3x + 33 = 180$
$3x = 147,\ x = 49$
$m\angle ABC = 49 + 41 = 90,$
Yes, $\overleftrightarrow{AB} \perp \overleftrightarrow{DC}$

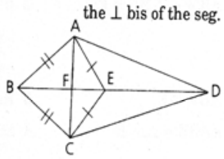
b $m\angle EBC = \sqrt{49} + 83 = 7 + 83 = 90,$
$\overleftrightarrow{AB}$ and $\overleftrightarrow{BE}$ are the same line.

11 Given: Isos $\triangle PQR$, $\overline{QS}$ bis $\angle Q$, and $\overline{RS}$ bis $\angle R$.
Prove: $\overleftrightarrow{PS} \perp \overline{QR}$



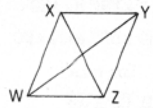
1 Isos $\triangle PQR$	1 Given
2 $\overline{PQ} \cong \overline{PR}$	2 An isos $\triangle$ has at least 2 sides $\cong$.
3 $\angle Q \cong \angle R$	3 If $\triangle$ then $\triangle$
4 $\overline{QS}$ bis $\angle Q$.	4 Given
5 $\overline{RS}$ bis $\angle R$.	5 Given
6 $\angle SQR \cong \angle SRQ$	6 Division prop
7 $\overline{SQ} \cong \overline{SR}$	7 If $\triangle$ then $\triangle$
8 $\overleftrightarrow{PS} \perp \overline{QR}$	8 Two pts =dist from endpts of a seg determine the $\perp$ bis of the seg.

12 Given: $\overline{AB} \cong \overline{BC}$, $\overline{AE} \cong \overline{EC}$
Prove: $\overline{AD} \cong \overline{DC}$



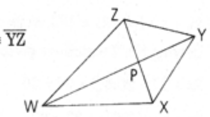
1 $\overline{AB} \cong \overline{BC}$	1 Given
2 $\overline{AE} \cong \overline{EC}$	2 Given
3 $\overline{BE} \perp$ bis $\overline{AC}$.	3 Two pts =dist from endpts of a seg determine the $\perp$ bis of the seg.
4 $\overline{AD} \cong \overline{DC}$	4 A pt on the $\perp$ bis of a seg is =dist from the endpts of the seg.

13 Given: $\overline{WY}$ and $\overline{XZ}$ are $\perp$ bis of each other.
Prove: $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$



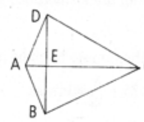
1 $\overline{WY}$ and $\overline{XZ}$ are $\perp$ bis of each other.	1 Given
2 $\overline{WX} \cong \overline{XY}$	2 A pt on the $\perp$ bis of a seg is =dist from the endpts of the seg.
3 $\overline{XY} \cong \overline{YZ}$	3 Same as 2
4 $\overline{YZ} \cong \overline{ZW}$	4 Same as 2
5 $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$	5 Transitive prop

14 Given: $\overline{WX} \cong \overline{WZ}$, $\overline{XY} \cong \overline{YZ}$
Prove: $\triangle WPZ$ is a rt $\triangle$.



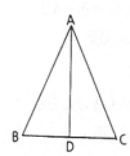
1 $\overline{WX} \cong \overline{WZ}$, $\overline{XY} \cong \overline{YZ}$.	1 Given
2 $\overline{WY} \perp \overline{ZX}$	2 Two pts =dist from endpts of a seg determine $\perp$ bis of that seg.
3 $\angle WPZ$ is a rt $\angle$.	3 $\perp$ lines intersect to form rt $\angle$s.
4 $\triangle WPZ$ is a rt $\triangle$.	4 If a $\triangle$ contains a rt $\angle$, then it is a rt $\triangle$.

15 Given: $\angle ADC$ and $\angle ABC$ are rt $\angle$s. $\overline{AB} \cong \overline{AD}$
Concl: $\overleftrightarrow{AC} \perp$ bis $\overline{BD}$.



1 $\angle ADC$ and $\angle ABC$ are rt $\angle$s.	1 Given
2 $\overline{AB} \cong \overline{AD}$	2 Given
3 $\overline{AC} \cong \overline{AC}$	3 Reflexive prop
4 $\triangle ADC \cong \triangle ABC$	4 HL
5 $\overline{DC} \cong \overline{BC}$	5 CPCTC
6 $\overleftrightarrow{AC} \perp$ bis $\overline{BD}$.	6 Two pts =dist from endpts of a seg determine the $\perp$ bis of the seg.

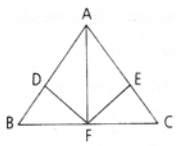
16 Given: $\triangle ABC$ is isos, base $\overline{BC}$. $\overline{AD}$ median $\overline{BC}$
Prove: $\overline{AD}$ is alt to $\overline{BC}$.



1 $\triangle ABC$ is isos, base $\overline{BC}$.	1 Given
2 $\overline{AD}$ median $\overline{BC}$	2 Given
3 $\overline{AB} \cong \overline{AC}$	3 An isos $\triangle$ has 2 sides $\cong$.

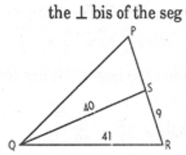
4 $\overline{BD} \cong \overline{CD}$	4 A median divides a seg into 2 $\cong$ segs.
5 $\overline{AD} \perp$ bis $\overline{BC}$.	5 Two pts =dist from endpts of a seg determine the $\perp$ bis of that seg.
6 $\overline{AD}$ is alt to $\overline{BC}$.	6 A seg from a vertex of a $\triangle$ $\perp$ to opp side is an alt of the $\triangle$.

17 Given: F mdpt $\overline{BC}$
$\overline{DB} \cong \overline{EC}$
$\overline{DB} \perp \overline{DF}$
$\overline{EC} \perp \overline{EF}$
Concl: $\overleftrightarrow{AF} \perp \overleftrightarrow{BC}$



1 F mdpt $\overline{BC}$	1 Given
2 $\overline{BF} \cong \overline{CF}$	2 A mdpt divides a seg into 2 $\cong$ segs.
3 $\overline{DB} \cong \overline{EC}$	3 Given
4 $\overline{DB} \perp \overline{DF}$, $\overline{EC} \perp \overline{EF}$	4 Given
5 $\angle FDB$ is a rt $\angle$.	5 $\perp$ lines intersect to form rt $\angle$s.
6 $\angle FEC$ is a rt $\angle$.	6 Same as 5
7 $\triangle DBF \cong \triangle ECF$	7 HL
8 $\angle B \cong \angle C$	8 CPCTC
9 $\overline{AB} \cong \overline{AC}$	9 If $\triangle$ then $\triangle$
10 $\overleftrightarrow{AF} \perp \overleftrightarrow{BC}$	10 Two pts =dist from the endpts of a seg determine the $\perp$ bis of the seg ($\overline{BC}$).

18 a Given: $\overline{PS} \cong \overline{SR}$
$\overline{PQ} \cong \overline{QR}$
Prove: $\overline{QS}$ is an alt.



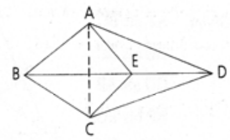
1 $\overline{PS} \cong \overline{SR}$	1 Given
2 $\overline{PQ} \cong \overline{QR}$	2 Given
3 $\overline{QS} \perp \overline{PR}$	3 Two pts =dist from the endpts of a seg determine the $\perp$ bis of the seg.
4 $\overline{QS}$ is an alt.	4 If a seg from a vertex of a $\triangle$ is $\perp$ to the opposite side, it is an alt of the $\triangle$.

b $\frac{1}{2}bh = \frac{1}{2}(18)(40) = 360$ **c** $9^2 + 40^2 = 41^2$

19 a P to T to R to E = 3 + 6 + 10 = 19 units.
P to C to E = 7 + 6 = 13 units.
Difference is 6 units.

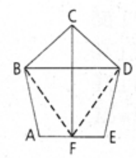
b (8, –2)

20 Given: $\overline{AB} \cong \overline{BC}$
$\overline{AE} \cong \overline{EC}$
Concl: $\overline{AD} \cong \overline{DC}$



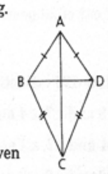
1 $\overline{AB} \cong \overline{BC}$, $\overline{AE} \cong \overline{EC}$	1 Given
2 Draw $\overline{AC}$	2 Two pts determine a line.
3 $\overleftrightarrow{BE} \perp$ bis $\overline{AC}$.	3 Two pts =dist from the endpts of a seg determine the $\perp$ bis of the seg.
4 $\overline{AD} \cong \overline{DC}$	4 A pt on the $\perp$ bis of a seg is =dist from the endpts of the seg.

21 Given: ABCDE is equilateral and equiangular.
F mdpt $\overline{AE}$
Prove: $\overleftrightarrow{FC} \perp$ bis $\overline{BD}$.



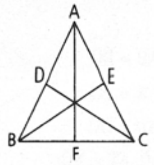
1 ABCDE is equilateral and equiangular.	1 Given
2 $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{DE}$	2 An equilateral polygon has all sides $\cong$.
3 $\angle A \cong \angle E$	3 An equiangular polygon has all $\angle$s $\cong$.
4 Draw $\overline{BF}$, $\overline{DF}$	4 Two pts determine a line.
5 F mdpt $\overline{AE}$	5 Given
6 $\overline{AF} \cong \overline{FE}$	6 Mdpt divides seg into 2 $\cong$ segs.
7 $\triangle BAF \cong \triangle DEF$	7 SAS
8 $\overline{BF} \cong \overline{DF}$	8 CPCTC
9 $\overleftrightarrow{FC} \perp$ bis $\overline{BD}$.	9 2 pts =dist from endpts of a seg determine $\perp$ bis of a seg.

22 Given: $\overline{AB} \cong \overline{AD}$
$\overline{CB} \cong \overline{CD}$
Prove: $\overline{AC} \perp$ bis $\overline{BD}$.



1 $\overline{AB} \cong \overline{AD}$, $\overline{CB} \cong \overline{CD}$	1 Given
2 $\overline{AC} \perp$ bis $\overline{BD}$.	2 Two pts =dist from endpts of a seg determine $\perp$ bis of seg.

23 Given: $\overline{AF}$ alt $\overline{BC}$
$\overline{BE}$ alt $\overline{AC}$
$\overline{CD}$ alt $\overline{AB}$
$\overline{AF}$ bis $\overline{BC}$.
$\overline{BE}$ bis $\overline{AC}$.
$\overline{CD}$ bis $\overline{AB}$.



Prove: $\triangle ABC$ is equilateral.

1 $\overline{AF}$ alt $\overline{BC}$	1 Given
2 $\overline{BE}$ alt $\overline{AC}$	2 Given
3 $\overline{CD}$ alt $\overline{AB}$	3 Given
4 $\overline{AF}$ bis $\overline{BC}$.	4 Given
5 $\overline{BE}$ bis $\overline{AC}$.	5 Given
6 $\overline{CD}$ bis $\overline{AB}$.	6 Given
7 $\overline{AF} \perp \overline{BC}$	7 Alt ⊥ to side
8 $\overline{BE} \perp \overline{AC}$	8 Same as 7
9 $\overline{CD} \perp \overline{AB}$	9 Same as 7
10 $\overline{AB} \cong \overline{CA}$	10 Pt on ⊥ bis is =dist from endpts.
11 $\overline{AB} \cong \overline{BC}$	11 Same as 10
12 $\overline{AB} \cong \overline{BC} \cong \overline{CA}$	12 Transitive prop
13 $\triangle ABC$ is equilateral.	13 An equilateral △ has all sides ≅.

24 a Possibilities: AB AC AD AE AM
BC BD BE BM
CD (CE) (CM)
DE DM
(EM)
3 out of 15 possibilities = $\frac{1}{5}$

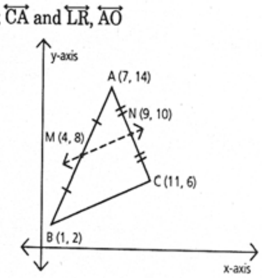
b ABC ABD ABE (ABM) ACD
ACE ACM ADE ADM AEM
BCD BCE BCM BDE BDM
BEM CDE CDM (CEM) DEM
2 out of 20 possibilities = $\frac{1}{10}$

Pages 196–197 (Section 4.5)

1 a ∠3 and ∠7, ∠4 and ∠8 b ∠1 and ∠5, ∠2 and ∠6
c ∠1 and ∠7, ∠2 and ∠4, ∠3 and ∠5, ∠8 and ∠6
d ∠7 and ∠8, ∠3 and ∠4 e ∠1 and ∠6, ∠2 and ∠5

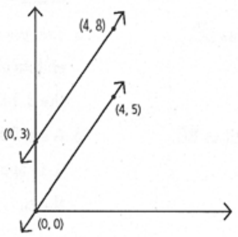
2 a Corresponding ∠s; $\overleftrightarrow{BC}$ b Corresponding; $\overleftrightarrow{CL}$ and $\overleftrightarrow{AO}$, $\overleftrightarrow{LR}$
c Alternate interior; $\overleftrightarrow{CA}$ and $\overleftrightarrow{LR}$, $\overleftrightarrow{AO}$

3 a M = (4, 8)
b N = (9, 10)
c $\overleftrightarrow{MN} \parallel \overleftrightarrow{BC}$
d ∠AMN ≅ ∠ABC
e ∠ANM and ∠ACB



4 a $\overleftrightarrow{JK}$ and $\overleftrightarrow{OM}$ b $\overleftrightarrow{JO}$ and $\overleftrightarrow{KM}$ c 3

5 a $\frac{5-0}{4-0} = \frac{5}{4}$
b $\frac{8-3}{4-0} = \frac{5}{4}$
c Parallel



Pages 202–204 (Section 4.6)

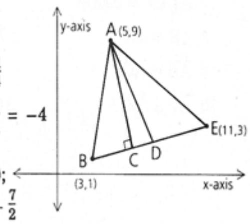
1 These problems use the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$.
a $m = \frac{15-7}{10-1} = \frac{8}{9}$
b $m = \frac{7-6}{5-(-2)} = \frac{1}{7}$
c $m = \frac{4-(-7)}{-2-(-8)} = \frac{11}{6}$

These problems use the slope formula $m = \frac{y_1 - y_2}{x_1 - x_2}$.
d $m = \frac{4-4}{5-(-2)} = 0$
e $m = \frac{7-(-9)}{\sqrt{3}-\sqrt{3}} = \frac{16}{0} =$
No slope
f $m = \frac{6c-(-9c)}{5a-2a} = \frac{15c}{3a} = \frac{5c}{a}$

2 $m(\overleftrightarrow{CD}) = \frac{1}{-m(\overleftrightarrow{AB})} = \frac{1}{-1\frac{2}{3}} = \frac{1}{-\frac{5}{3}} = -\frac{3}{5}$ 3 −4

4 $m(\overleftrightarrow{FE}) = \frac{7-3}{2-4} = \frac{4}{-2}$, so $m(\overleftrightarrow{FH}) = \frac{1}{-m(\overleftrightarrow{FE})} = \frac{1}{2}$

5 a $m(\overleftrightarrow{BE}) = \frac{3-1}{11-3} = \frac{2}{8} = \frac{1}{4}$
b $m(\overleftrightarrow{AC}) = \frac{1}{-m(\overleftrightarrow{BE})} = \frac{1}{-\frac{1}{4}} = -4$
c D = mdpt of $\overline{BE}$ = (7, 2);
$m(\overleftrightarrow{AD}) = \frac{9-2}{5-7} = \frac{7}{-2} = -\frac{7}{2}$



d Since the line is ∥, it has the same slope, $\frac{1}{4}$.

6
$$m(\overleftrightarrow{AB}) = 2\frac{1}{2} = \frac{k-7}{12-2}$$
$$\frac{5}{2} = \frac{k-7}{10}$$
$$2(k-7) = 5(10)$$
$$2k - 14 = 50$$
$$2k = 64$$
$$k = 32$$

7 $m(\overleftrightarrow{FH}) = \frac{10-8}{9-2} = \frac{2}{7}$, $m(\overleftrightarrow{JK}) = \frac{3-5}{6-13} = \frac{2}{7}$
$\overleftrightarrow{FH} \parallel \overleftrightarrow{JK}$
$m(\overleftrightarrow{FK}) = \frac{3-8}{6-2} = -\frac{5}{4}$, $m(\overleftrightarrow{HJ}) = \frac{5-10}{13-9} = -\frac{5}{4}$
$\overleftrightarrow{FK} \parallel \overleftrightarrow{HJ}$

8 a $m(\overleftrightarrow{RE}) = \frac{5-1}{10-(-2)} = \frac{4}{12} = \frac{1}{3}$
$m(\overleftrightarrow{TC}) = \frac{8-4}{9-(-3)} = \frac{4}{12} = \frac{1}{3}$
$\overleftrightarrow{RE}$ and $\overleftrightarrow{TC}$ are ∥.
b $m(\overleftrightarrow{TR}) = \frac{4-1}{-3-(-2)} = \frac{3}{-1} = -3$
$m(\overleftrightarrow{CE}) = \frac{8-5}{9-10} = \frac{3}{-1} = -3$
$\overleftrightarrow{TR}$ and $\overleftrightarrow{CE}$ are ∥.