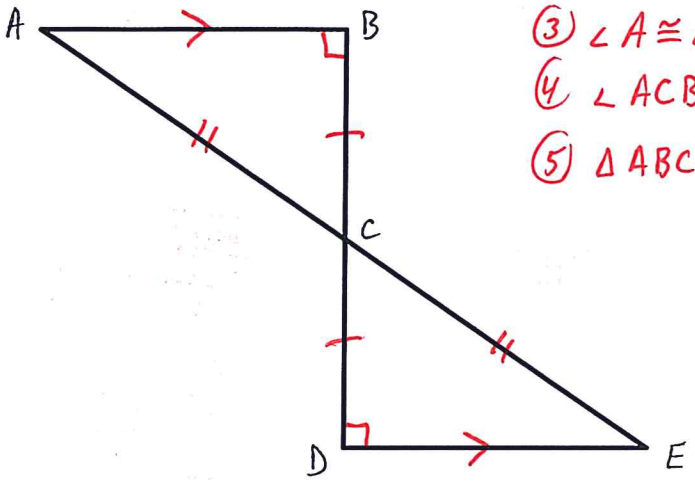
Week 3 Material
Pre-Test

Prove the following triangles are CONGRUENT using SSS, SAS, ASA, AAS or HL:

1. **Given:** $\overline{AB} \parallel \overline{ED}$
   $\overline{BD} \perp \overline{AB}$
   $\overline{BD} \perp \overline{DE}$
   Prove: $\Delta ABC \cong \Delta DEC$

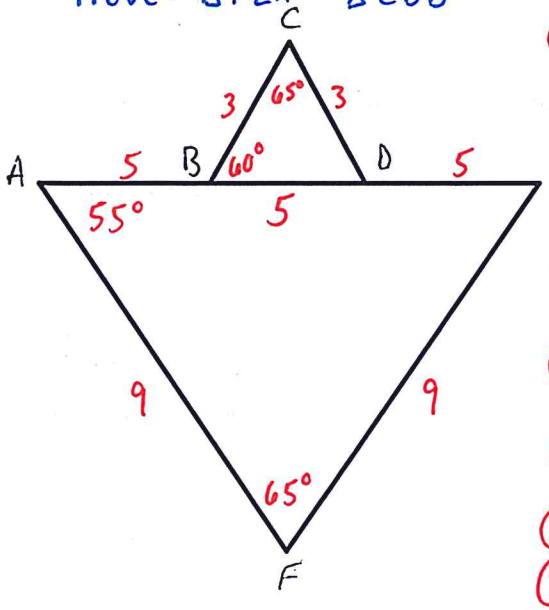


Statements	Reasons
① $\overline{AB} \parallel \overline{ED}$, $\overline{BD} \perp \overline{AB}$, $\overline{BD} \perp \overline{DE}$ missing C midpt of $\overline{AE}$ & $\overline{BD}$	① Given
② $\overline{BC} \cong \overline{CD}$; $\overline{AC} \cong \overline{CE}$	② Def Midpoint
③ $\angle A \cong \angle E$; $\angle B \cong \angle D$	③ Alt. Int. $\angle$'s
④ $\angle ACB \cong \angle DCE$	④ Vertical $\angle$'s
⑤ $\Delta ABC \cong \Delta DEC$	⑤ SAS, ASA, AAS, & HL are possible.

Prove the following triangles are SIMILAR using SSS, SAS, or AA:

2. **Given:** AB = 5, BD = 5, DE = 5
   BC = 3, CD = 3, AF = 9, EF = 9
   $\angle A = 55^o$, $\angle F = 65^o$, $\angle C = 65^o$, $\angle CBD = 60^o$

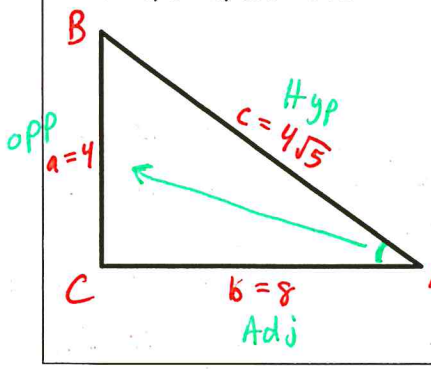
Prove: $\Delta FEA \sim \Delta CBD$



Statements	Reasons
① AB = 5, BD = 5, DE = 5, BC = 3, CD = 3, AF = 9, EF = 9, $\angle A = 55°$, $\angle F = 65°$, $\angle C = 65°$, $\angle CBD = 60°$	① Given
② $\frac{FE}{CB} = \frac{9}{3} = \frac{3}{1}$	② ÷ T/B by 3
③ $\frac{EA}{BD} = \frac{15}{5} = \frac{3}{1}$	③ ÷ T/B by 5
④ $\frac{FA}{CD} = \frac{9}{3} = \frac{3}{1}$	④ ÷ T/B by 3
⑤ $\frac{FE}{CB} = \frac{EA}{BD} = \frac{FA}{CD} = \frac{3}{1}$	⑤ Transitive Property.
⑥ $\angle CDB = 55°$ & $\angle E = 60°$	⑥ Δ sum Thm.
⑦ $\angle A = \angle CDB$; $\angle E = \angle CBD$, $\angle F = \angle A$	⑦ Transitive Property
⑧ $\angle A \cong \angle CDB$; $\angle E \cong \angle CBD$; $\angle F \cong \angle A$	⑧ Definition Congruence
⑨ $\Delta FEA \sim \Delta CBD$	⑨ AA, SSS, or SAS.

Evaluate the six trigonometric functions for the regular right triangle using ∠A:

3. a = 4, b = 8, & c = $4\sqrt{5}$



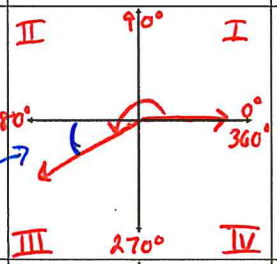
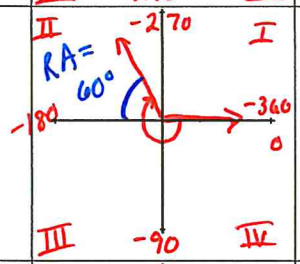
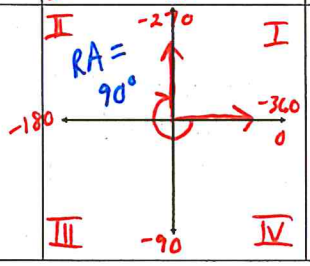
SOH - CAH - TOA

$\sin A = \frac{opp}{Hyp} = \frac{4}{4\sqrt{5}} = \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{\sqrt{5}}{5}}$ $\quad \csc A = \boxed{\frac{\sqrt{5}}{1}}$

$\cos A = \frac{Adj}{Hyp} = \frac{8}{4\sqrt{5}} = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{2\sqrt{5}}{5}}$ $\quad \sec A = \boxed{\frac{\sqrt{5}}{2}}$

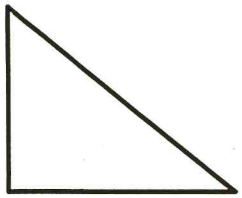
$\tan A = \frac{opp}{adj} = \frac{4}{8} = \boxed{\frac{1}{2}}$ $\quad \cot A = \boxed{\frac{2}{1}}$

Using the hand trick discussed in class, give the exact value of each of the following trig functions:

Given Angle	Reference Angle	Quadrant Terminal Side is located in	Exact Value
4. $\sin 210^o$ 210 − 180 = 30°, RA = 30°		Quadrant III	$\frac{\sqrt{\text{below}}}{2}$ $-\frac{\sqrt{1}}{2} = \boxed{-\frac{1}{2}}$
5. $\cos -240^o$ 240 − 180 = 60°		Quadrant II	$\frac{\sqrt{\text{above}}}{2}$ $-\frac{\sqrt{1}}{2} = \boxed{-\frac{1}{2}}$
6. $\tan -270^o$ 270 − 180 = 90°		On the pos y-axis	$\frac{\sqrt{\text{below}}}{\sqrt{\text{above}}}$ $\frac{\sqrt{4}}{\sqrt{0}} = \frac{2}{0}$ undefined

Solve the following triangles given the information provided on a separate sheet of paper:

7. ∠A = 60° & c = 15



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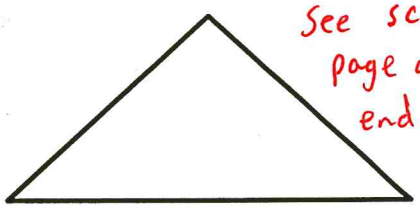
8. a = 29, b = 13, & ∠C = 41°



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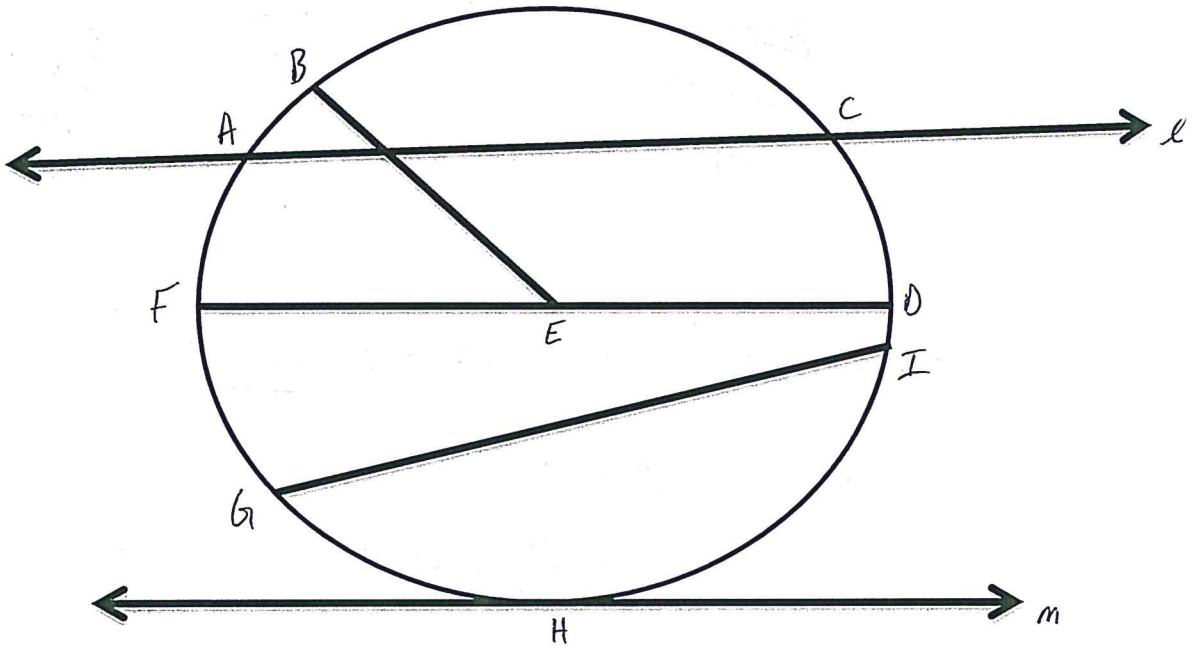
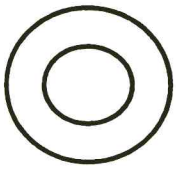
Use the following figure to answer questions #1 - #7 :

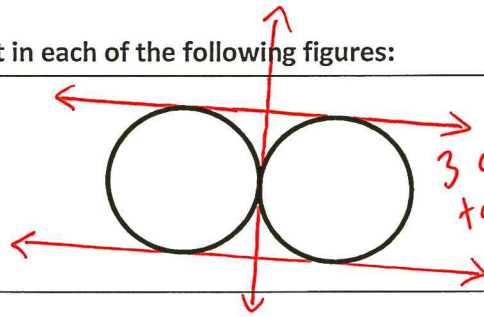


1. Name any chords shown above. $\overline{FD}$, $\overline{GI}$, & $\overline{AC}$	2. Name the secant shown above. $\overleftrightarrow{AC}$ or line ℓ
3. Name the diameter shown above. $\overline{FD}$	4. Name all radi shown above. $\overline{FE}$, $\overline{BE}$, & $\overline{ED}$
5. Name the tangent shown above. line m	6. Name the point of tangency shown above. H
7. Name the circle shown above. $\odot E$	

Identify the number of and draw each common tangent in each of the following figures:

8. 

Zero common Tangents.

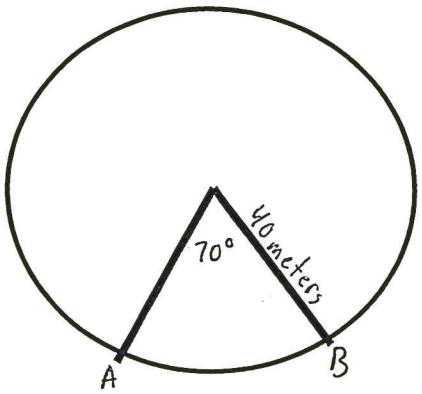
9. 

Find the indicated measure:

10. Find the circumference of a circle with a diameter of 40 meters.

$C = \pi d \rightarrow C = \pi(40) \rightarrow \boxed{C = 40\pi}$

11. Find the length of $\overset{\frown}{AB}$ given



$AB = \frac{m\,AB}{360} \cdot 2\pi r$

$= \frac{70}{360} \cdot \frac{2\pi(40)}{1}$

$= \frac{5600\pi}{360}$

$= \boxed{\frac{140}{9}\pi}$

Find the indicated measure:

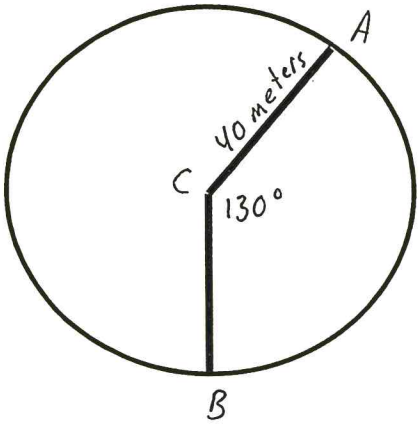
12. Find the area of a circle with a diameter of 40 meters.

$d = 2r$

$\frac{40}{2} = \frac{2r}{2}$ $\quad r = 20$

$A = \pi r^2 \rightarrow A = \pi(20)^2 \rightarrow \boxed{A = 400\pi}$

13. Find the area of the sector given:



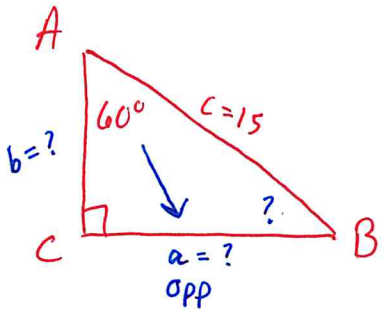
$A_{sec} = \frac{m\overset{\frown}{AB}}{360} \cdot \pi r^2$

$= \frac{130°}{360°} \cdot \frac{\pi(40)^2}{1}$

$= \frac{208000\pi}{360}$

$= \boxed{\frac{5200}{9}\pi}$

(7) $\angle A = 60^\circ$ & $c = 15$



$\angle B = 180 - 90 - 60$

$\boxed{\angle B = 30^\circ}$

SOH

$15 \cdot \sin 60 = \frac{a}{15} \cdot 15$

$15 \sin 60 = a$

$12.99038106 \approx a$

$\boxed{13 \approx a}$

CAH

$15 \cdot \cos 60 = \frac{b}{15} \cdot 15$

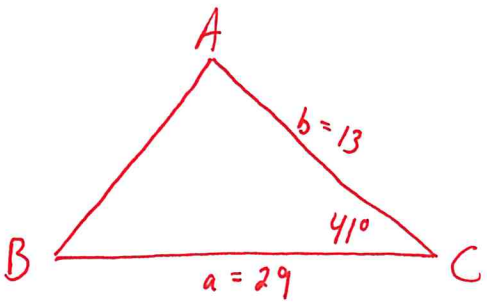
$15 \cos 60 = b$

$\boxed{7.5 = b}$

~~TOA~~

~~$\tan 60 = \frac{a}{b}$~~

(8) $a = 29,\ b = 13,\ \angle C = 41^\circ$



(A) Law of Cosines

$c^2 = a^2 + b^2 - 2ab \cdot \cos C$

$c^2 = 29^2 + 13^2 - 2(13)(29) \cos 41$

$c^2 = 841 + 169 - 754 \cos 41$

$c^2 = 1010 - 754 \cos 41$

$\sqrt{c^2} = \sqrt{440.9489765}$

$c \approx 20.99878512$

$\boxed{c \approx 21}$

(B) Law of Sines

$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

$\frac{\sin A}{29} = \frac{\sin B}{13} = \frac{\sin 41}{21}$

$\frac{21 \sin B}{21} = \frac{13 \sin 41}{21}$

$\sin^{-1}(\sin B) = \sin^{-1}\left(\frac{13 \sin 41}{21}\right)$

$\angle B \approx 23.96206975$

$\boxed{\angle B \approx 24^\circ}$

Triangle Sum Thm for last Angle:

$\angle A = 180 - 41 - 24$

$\boxed{\angle A = 115^\circ}$