Pre-Calc AB | Lesson 11 | 8/17/15

Agenda: 8/17/15

Period 2: Lexi R.

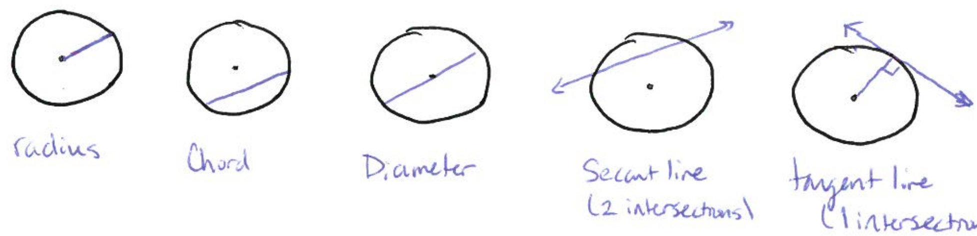
Period 8: Ary Nath

- HW Leader:
- Lesson 11
  - Circles + properties
  - quadratic formula
- Work on WS

★ Test 1 on Wednesday
15 questions 5 mc 100 pts

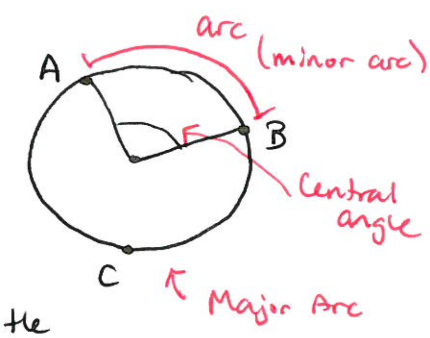
T/F If you can't factor a quadratic equation then you can solve by completing the square.
Might not be real solutions

Circles:



Circumference is the perimeter of a circle.

- $\overset{\frown}{AB}$ reads "arc AB" [minor]
- $\overset{\frown}{ACB}$ reads "arc ACB" [major]



★ Measure of an arc means angular measure of the Arc which means the measure of the central angle

★ Two circles are congruent if they have the same radius.

- $m\overset{\frown}{AB}$ means the measure of "arc AB"

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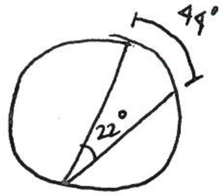
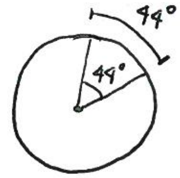
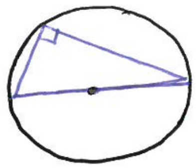
Properties:

- The measure of an inscribed angle is equal to half of its intercepted arc.

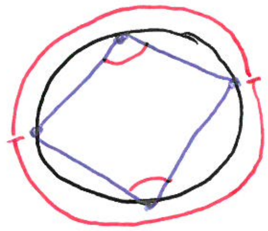




- Any inscribed angle that intercepts a diameter has measure of 90°.

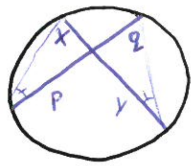


- The measure of any pair of opposite angles in a quadrilateral inscribed in a circle is 180°.



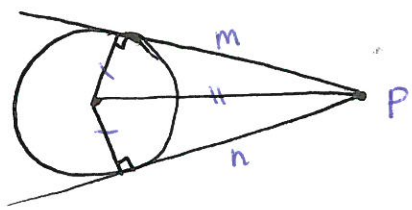
$\frac{1}{2} \cdot 360^\circ = 180^\circ$

- The product of length segments of one chord = the product of lengths of segments of other chords.



$xy = pq$

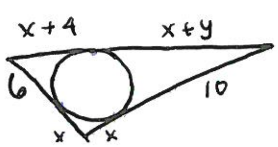
- Two tangent segments from a point outside a circle have equal lengths.



Both right triangles with two equal sides So by Pythagoreas $m = n$.

Example 11.5

Find x and y:



$6 = x + 4$

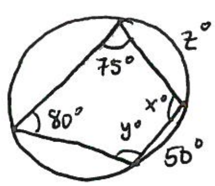
$\boxed{x = 2}$

$x + y = 10$

$\boxed{y = 8}$

Ex. 11.2

Find x, y, z



$\boxed{x = 100 \quad y = 105}$

$z^\circ + 50^\circ + 210^\circ = 360$

$\boxed{z = 100}$

Pre-Calc AB

Lesson 11

8/17/15

Quadratic Formula: $ax^2+bx+c=0$

1. Standard form $\quad ax^2+bx+c=0$
2. Eliminate leading Coef. $\quad x^2+\frac{b}{a}x+\frac{c}{a}=0$
3. Move Constant $\quad \left(x^2+\frac{b}{a}x \quad\right) = -\frac{c}{a}$
4. Add $\left(\frac{1}{2}\left(\frac{b}{a}\right)\right)^2$ to both sides $\quad \left(x^2+\frac{b}{a}x+\left(\frac{b}{2a}\right)^2\right) = \left(\frac{b^2}{4a^2}\right)-\frac{c}{a}$
5. Factor $\quad \left(x+\frac{b}{2a}\right)^2 = \frac{b^2-4ac}{4a^2}$
6. Solve $\quad x = -\frac{b}{2a} \pm \frac{\sqrt{b^2-4ac}}{2a}$

$$\boxed{x = \frac{-b\pm\sqrt{b^2-4ac}}{2a}}$$

Pre-Calc AB

Lesson 12

8/18/15

Agenda: 8/18/15

HW Leader:

Period 2: Bita M.

Period 8: Brittany L.

Lesson 12/13

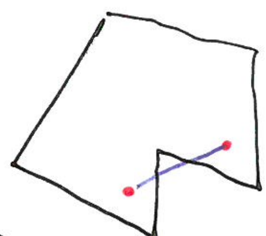
Angles/Diagonals in polygons

Intersecting secants tangents

★ Test 1 tomorrow

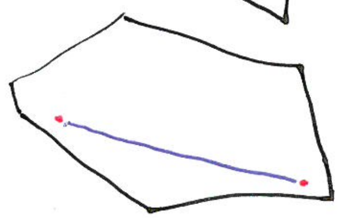
Concave Polygon

2 points that can't be connected by a line in the polygon



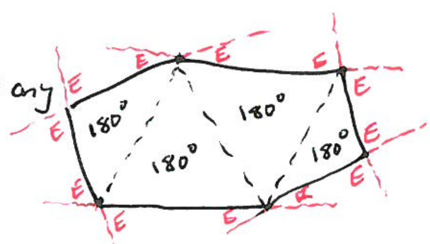
Convex Polygon

Any 2 points in the polygon can be connected by a line that is completely in it.



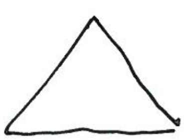
- We can find the sum of the interior angles of any convex polygon by triangulating the polygon.

- The sum of all exterior angles of any convex polygon is 360°.

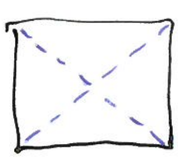


E - Exterior Angles

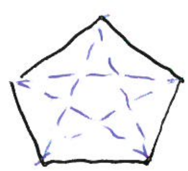
Diagonals in a Polygon



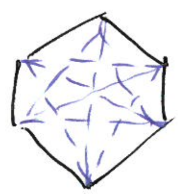
0 Diagonals



2 Diagonals



5 Diagonals



9 Diagonals

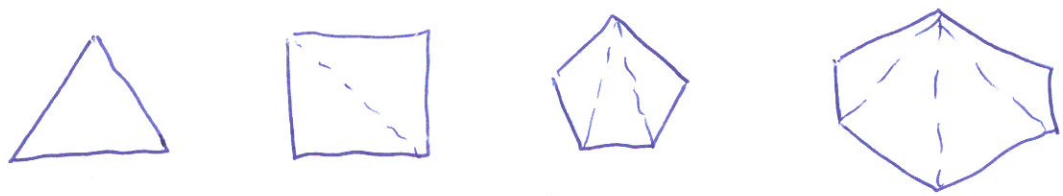
N = number of vertices
V = vertex

} Can be connected to N-3 other vertices (Not itself or its two neighbors)

N vertices each with N-3 diagonals but over count by 2

So $\boxed{\text{Number of Diagonals of Convex polygon with N vertices} = \dfrac{N(N-3)}{2}}$

Triangulate Polygons



1 Tri   2 Tri   3 Tri   4 Tri

$\boxed{\text{Sum of interior angles Convex Polygon with N vertices} = 180^\circ(N-2)}$

Intersecting Secants / Tangents

$\boxed{\text{Lesson 13}}$

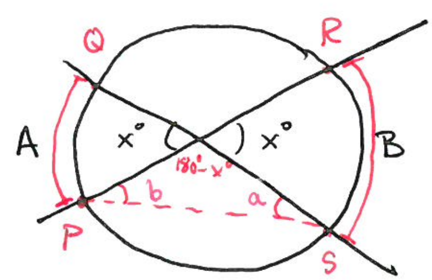
- A tangent line touches a circle at one point.
- A secant line intersects a circle at 2 points.

$\boxed{X = \dfrac{A+B}{2}}$

$\frac{1}{2} m\widehat{PQ} = m\angle a$

$\frac{1}{2} m\widehat{RS} = m\angle b$

$m\angle x = m\angle a + m\angle b$

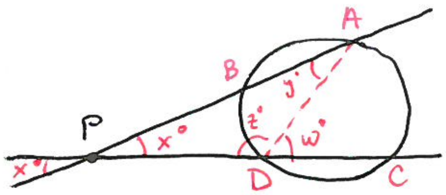


Pre-Calc AB

Lesson 13

8/18/15

Two Secants



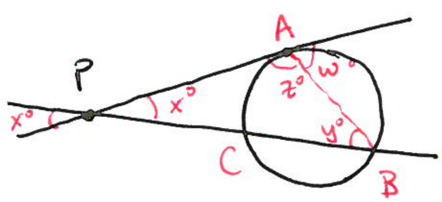
① $\frac{1}{2} m\widehat{AC} = w°$ ② $\frac{1}{2} m\widehat{BD} = y°$

③ $x° = 180 - y° - z°$ ④ $z° = 180 - w°$

⑤ $x° = w° - y°$ [by ③ and ④]

⑥ $\boxed{x° = \dfrac{m\widehat{AC} - m\widehat{BD}}{2}}$ [by ① and ②]

Secant + Tangent

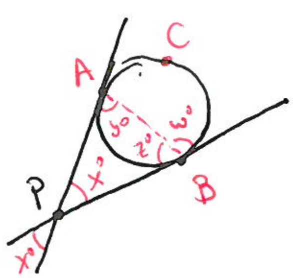


① $\frac{1}{2} m\widehat{AC} = y°$ ② $\frac{1}{2} m\widehat{AB} = w°$

③ $x° = w° - y°$

④ $\boxed{x° = \dfrac{m\widehat{AB} - m\widehat{AC}}{2}}$

Two Tangents



① $\frac{1}{2} m\widehat{ACB} = w°$ ② $\frac{1}{2} m\widehat{AB} = y°$

③ $x° = w° - y°$

④ $\boxed{x° = \dfrac{m\widehat{ACB} - m\widehat{AB}}{2}}$

Pre-Calc AB

Lesson 13

8/20/15

Agenda: 8/20/15

HW Leader:

Lesson 13/14

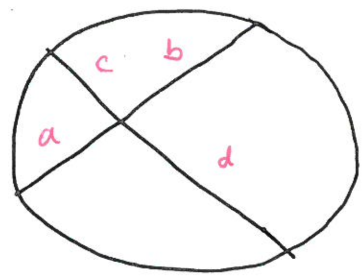
- Product of Secant/tangent Segments
- sin, cos, tan
- Test 1 back at the end

Period 2: Brady A.

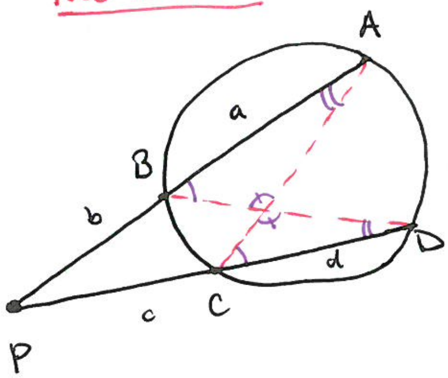
Period 8: Bryce M.

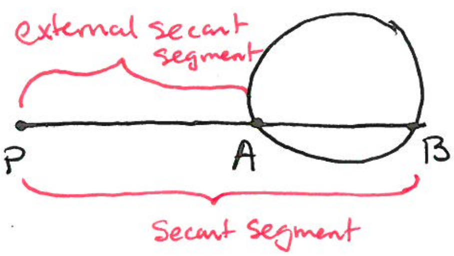
- Product of segments of two intersecting cords of a circle are equal.

$$\boxed{a \cdot b = c \cdot d}$$



Two Secants





$\triangle PAC \sim \triangle PDC$

$$\frac{a+b}{d+c} = \frac{c}{b}$$

$$\boxed{b(a+b) = c(d+c)}$$

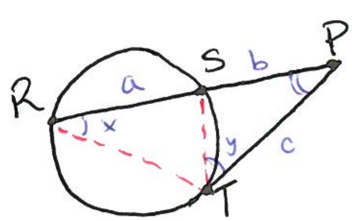
Secant + Tangent

$\frac{1}{2} m\overset{\frown}{ST} = x^\circ$ $\qquad$ $\frac{1}{2} m\overset{\frown}{ST} = y^\circ$

So $\triangle RPT \sim \triangle TPS$

So $$\frac{a+b}{c} = \frac{c}{b}$$

$$\boxed{b(a+b) = c^2}$$

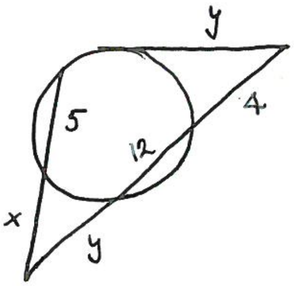


Pre-Calc AB

Lesson 13

8/20/15

Ex. 13.12 Find x and y.



① $x(5+x) = y(y+4)$

② $(4+12)4 = y^2$

$\boxed{y = 8}$

① $x^2 + 5x = 96$

$x^2 + 5x - 96 = 0$

$x = \dfrac{-5 \pm \sqrt{25 + 4 \cdot 96}}{2}$

$x = \dfrac{-5 \pm \sqrt{409}}{2}$

Important: x is a distance so $x \geq 0$

$\boxed{x = \dfrac{-5 + \sqrt{409}}{2}}$

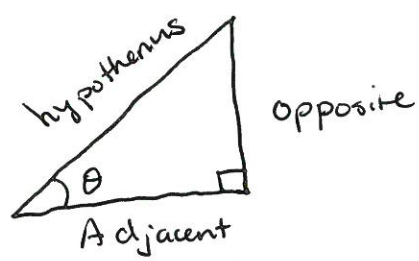
Lesson 14

Define the ratio of sides:

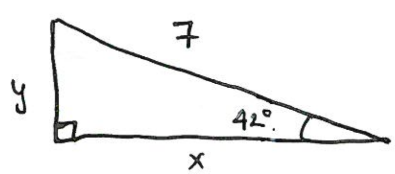
$\sin\theta = \dfrac{opp}{hyp}$ — Soh

$\cos\theta = \dfrac{adj}{hyp}$ — Cah

$\tan\theta = \dfrac{opp}{adj}$ — Toa



Ex. Find side y and side x exactly and approx. to 3 decimal places.



$\sin 42° = \dfrac{y}{7}$ $\quad$ $\cos 42° = \dfrac{x}{7}$

$y = 7\sin 42°$ $\quad$ $x = 7\cos 42°$

$\boxed{y \approx 4.684}$ $\quad$ $\boxed{x \approx 5.202}$

Pre-Calc AB

Lesson 14

8/21/15

Agenda: 8/21/15

HW leader:

Period 2	Period 8
Ethan A.	Delaney B.

Lesson 14

- Angles of elevation/depression
- Rectangular/Polar Coords
- Coords conversion

★ WS 2 Handout

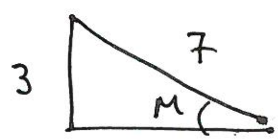
- Recall Trig definitions

On Calculator: [sin] [3] [6] [2nd] [angle] [°] [)] [Enter]

Gives $\sin(36°) \approx 0.5877853$

To Find angles:

Ex. 14.2 Find M

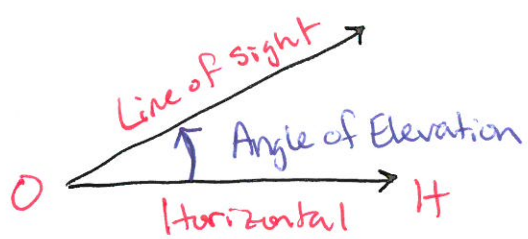


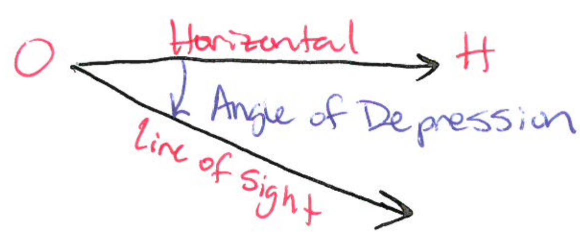
$\sin M = \frac{3}{7}$

Apply the inverse of sin to find M.

$M = \sin^{-1}\left(\frac{3}{7}\right) \approx 25.38°$ [2nd] [sin] [3] [÷] [7] [)] [Enter]

Angles of Elevation and Depression





Pre-Calc AB

Lesson 14

8/21/15

Rectangular Coordinates :

Notation : $(3, -4)$ or $3\hat{i} - 4\hat{j}$

Ordered Pair (x, y) — Vector Notation

hats to avoid confussion with complex

- 3 units in the x-direction then -4 units in the y-direction

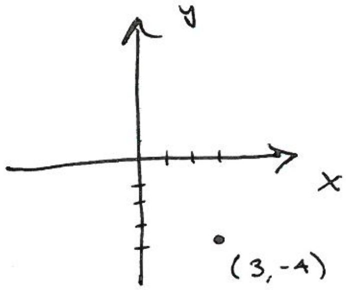
Polar Coordinates :

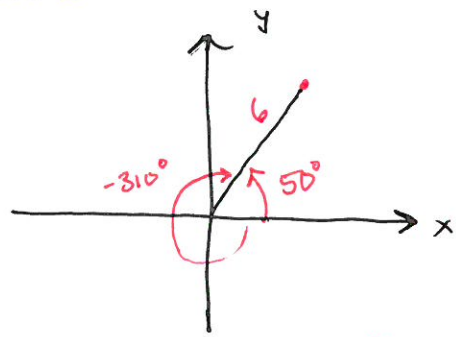
★ Positive angles are measured counter clockwise from the positive x-axis and negative angles clockwise.

Notation : $(6, 50°)$ or $6\angle 50°$

ordered pair (r, θ)

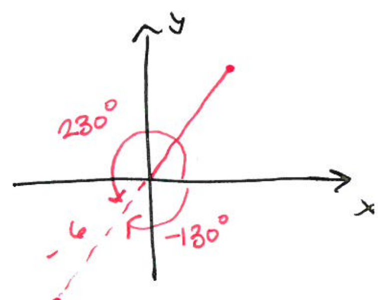
- 50° from positive x-axis, 6 units distance.





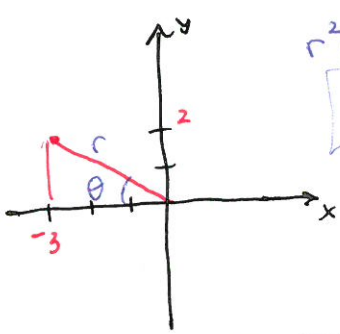
$6\angle 50°$ or $6\angle -310$

Conversion :



$-6\angle 230°$ or $-6\angle -130°$

Ex. 14.5 Convert $-3\hat{i} + 2\hat{j}$ to polar.



$r^2 = (-3)^2 + (2)^2 = 13$

$\boxed{r = \sqrt{13}}$

$\tan\theta = \frac{2}{3}$ so

$\boxed{\theta \approx 33.69°}$

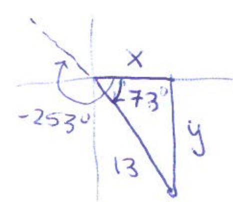
$\boxed{\sqrt{13}\angle 146.31° \text{ or } \sqrt{13}\angle -213.69° \text{ or } -\sqrt{13}\angle -33.69 \text{ or } -\sqrt{13}\angle 326.31°}$

Ex. 14.6 Convert $-13\angle -253°$ to rect.

$x = 13\cos 73° \approx 3.80$

$y = 13\sin 73° \approx 12.43$

$\boxed{3.80\hat{i} - 12.43\hat{j}}$



Pre-Calc AB | Lesson 15 | 8/24/15

Agenda: 8/24/15

HW Leader: Period 2: Jack S. — Period 8: Eli D.

Lesson 15

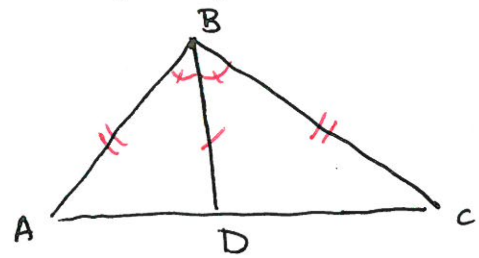
proofs

★ Handout Calendar part 2

★ Quiz 3 on Wednesday

Example 15.5 Given: $\overline{BD}$ is the angle bisector of angle B, $\overline{AB} \cong \overline{CB}$

Prove: $\overline{AD} \cong \overline{CD}$

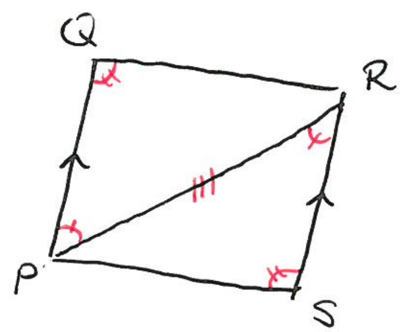


Proof:

Statements	Reasons
1. $\overline{AB} \cong \overline{CB}$	Given
2. $\overline{BD}$ angle bisector of B	Given
3. $\angle ABD \cong \angle CBD$	Def of angle bisector
4. $\overline{BD} \cong \overline{BD}$	Reflexive Property
5. $\triangle ABD \cong \triangle CBD$	SAS
6. $\overline{AD} \cong \overline{CD}$	CPCTC or by 5

Ex. 15.6 Given: $\angle Q \cong \angle S$, $\overline{PQ} \parallel \overline{SR}$

Prove: $\triangle PQR \cong \triangle RSP$



Proof:

Statements	Reasons
1. $\angle Q \cong \angle S$	Given
2. $\overline{PQ} \parallel \overline{SR}$	Given
3. $\angle QPR \cong \angle SRP$	Alternate interior angles of parallel lines
4. $\overline{PR} \cong \overline{PR}$	Reflexive Property
5. $\triangle PQR \cong \triangle RSP$	By AAS