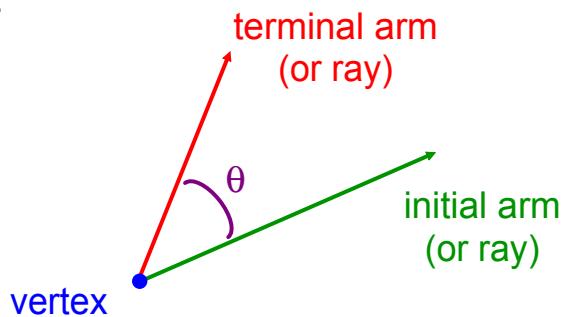


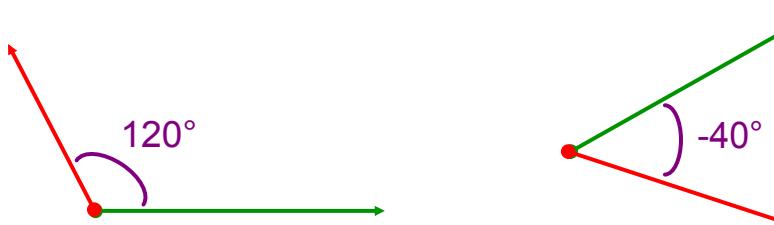
Angles in the Cartesian (x-y) Plane

Apr. 26/2012

Terminology:



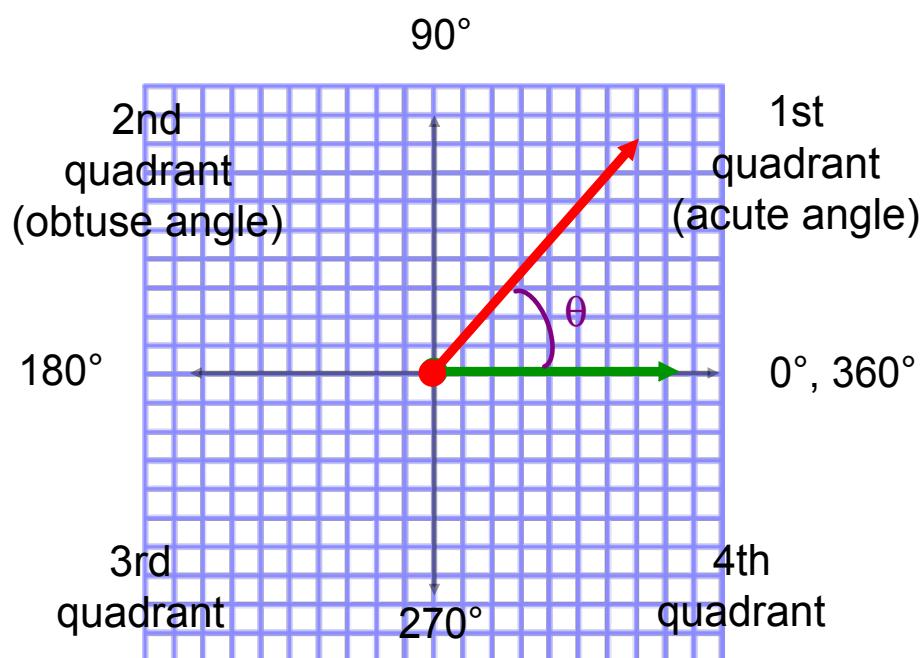
- an angle is positive if measured counter clockwise, and negative if measured clockwise.



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Definitions:

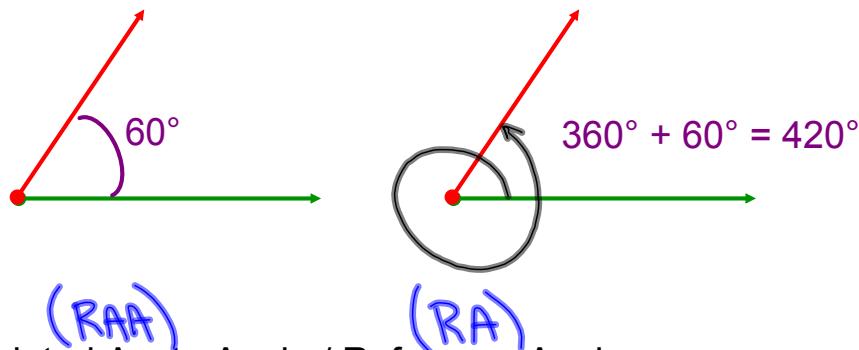
1. Standard Position - the vertex is at the origin and the initial arm is on the positive x-axis.



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2. Principal Angle - an angle between 0° and 360° .

3. Coterminal Angle(s) - angles that share the same initial and terminal arm.



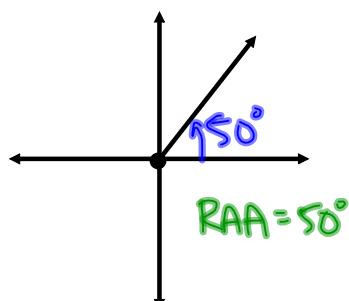
4. Related Acute Angle / Reference Angle

- an angle formed between the terminal arm and the (closest part of the) x-axis.
- always positive
- always acute ($0^\circ < \theta < 90^\circ$)

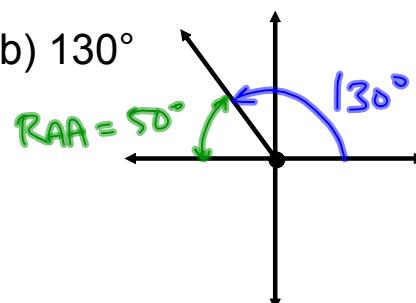
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Ex.1 Show the terminal arm for each angle:

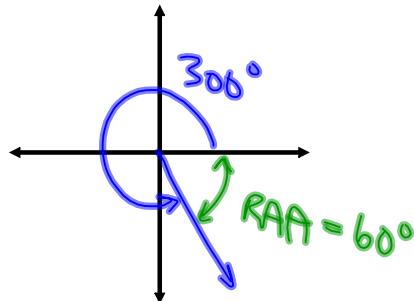
(a) 50°



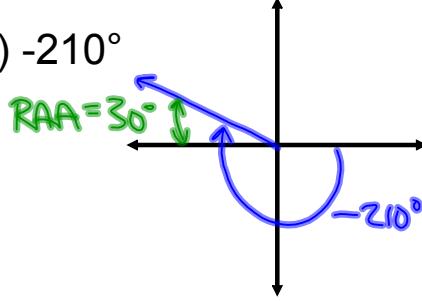
(b) 130°



(c) 300°



(d) -210°



Dec 10-10:43 PM

Ex.2 State the principal angle of: $(0^\circ \rightarrow 360^\circ)$

$$(a) 463^\circ > 360^\circ$$

$$\frac{-360^\circ}{103^\circ}$$

$$PA = 103^\circ$$

$$(b) 940^\circ > 360^\circ$$

$$\frac{-360^\circ}{580^\circ}$$

$$\frac{-360^\circ}{220^\circ}$$

$$PA = 220^\circ$$

$$(c) -387^\circ < 0^\circ$$

$$\frac{+360^\circ}{-27^\circ}$$

$$\frac{+360^\circ}{333^\circ}$$

Ex.3 State 3 coterminal angles of:

$$(a) 115^\circ \rightarrow -360^\circ$$

$$\begin{array}{r} +360^\circ \\ -245^\circ \\ \hline 475^\circ \\ +360^\circ \\ \hline 835^\circ \end{array}$$

$$(b) 28^\circ$$

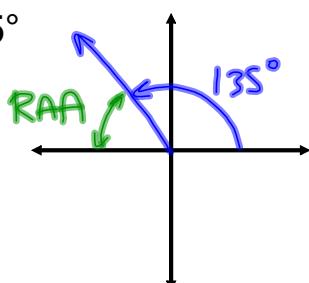
$$\begin{array}{l} CT_1 = 388^\circ \\ CT_2 = -1412^\circ \\ CT_3 = 3628^\circ \end{array}$$

add or subtract
multiples of 360°

Apr 21-12:13 AM

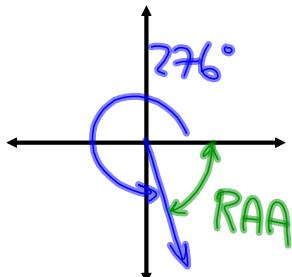
Ex.4 Determine the reference angle (RAA) for:

$$(a) 135^\circ$$



$$\begin{aligned} RAA &= 180^\circ - 135^\circ \\ &= 45^\circ \end{aligned}$$

$$(b) 276^\circ$$

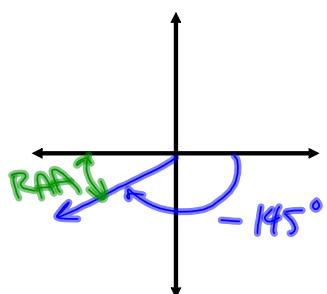


$$\begin{aligned} RAA &= 360^\circ - 276^\circ \\ &= 84^\circ \end{aligned}$$

Apr 21-12:14 AM

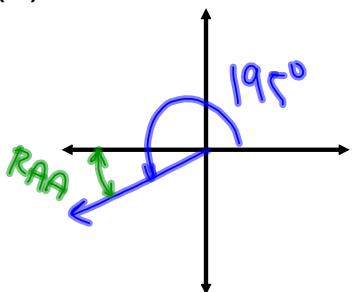
Ex.4 Determine the reference angle (RAA) for:

(c) -145°



$$\begin{aligned} RAA &= 180^\circ + (-145^\circ) \\ &= 35^\circ \end{aligned}$$

(d) 195°



$$\begin{aligned} RAA &= 195^\circ - 180^\circ \\ &= 15^\circ \end{aligned}$$

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Assigned Work:

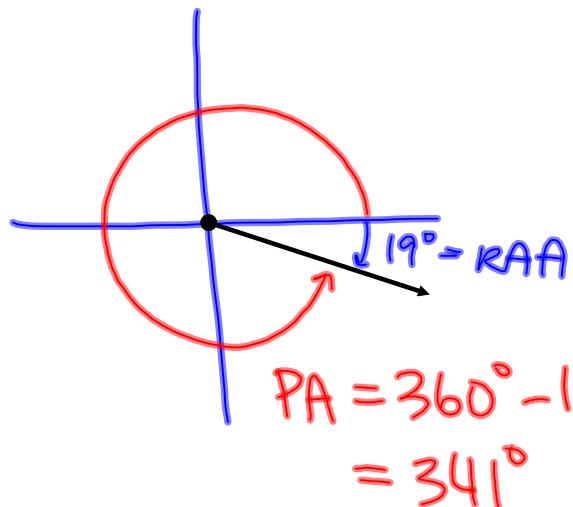
(Handout) p.422 # 3 - 9 (odd), 11a

9(c)

11(a)

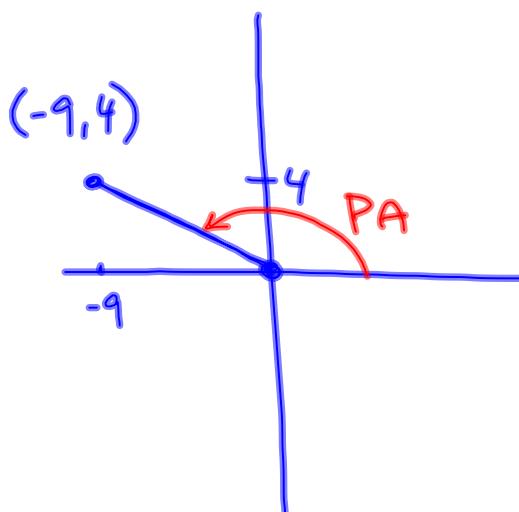
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9(c) RAA = 19° , Q4



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11(a) $P(-9, 4)$



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