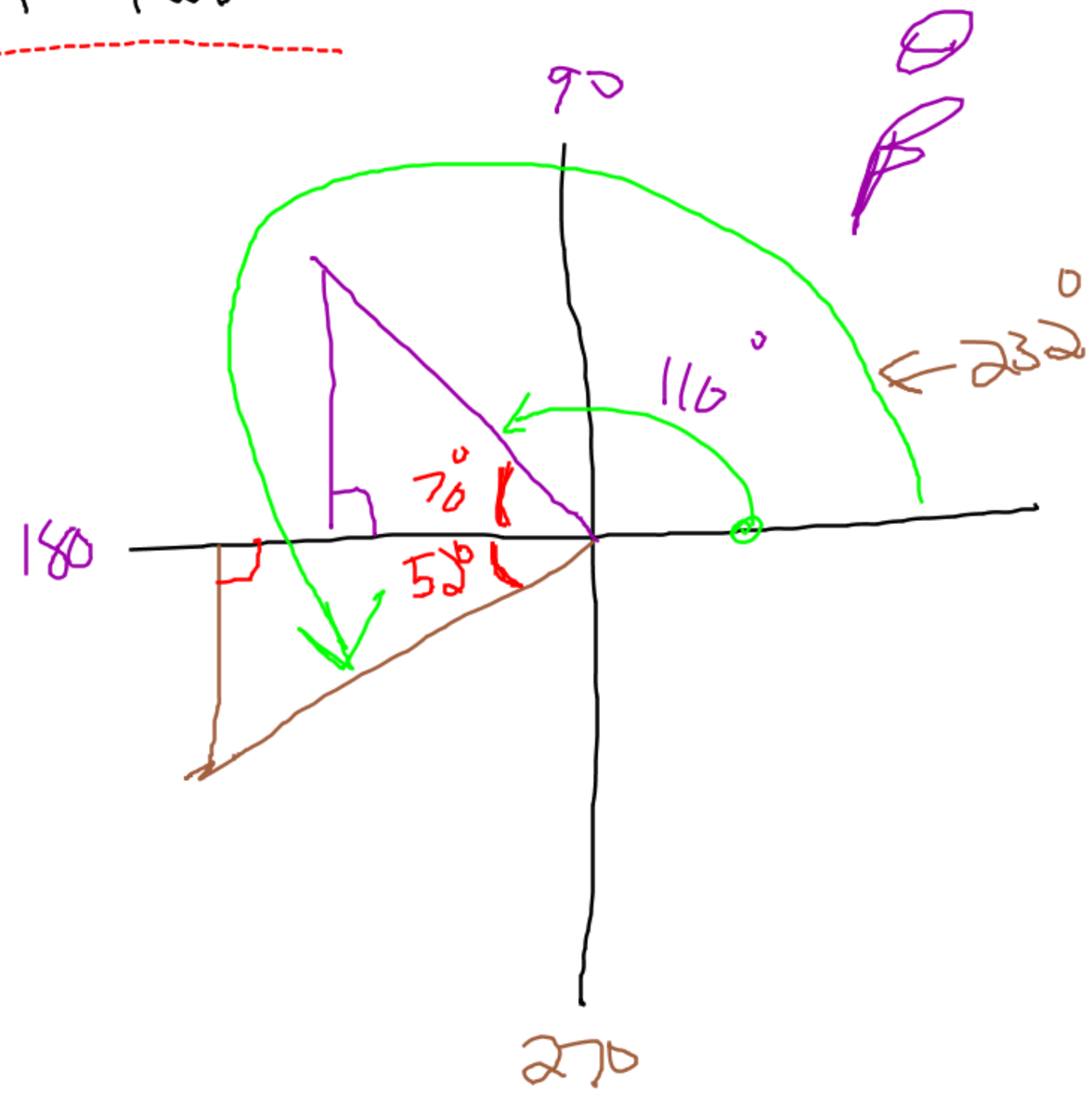
5.4 | Angles over 90° part two.

Terminology:

- terminal arm
- principal angle
- related acute angle



① $\tan 110$ ② $\sec 232$

The CAST rule and 3 equalities

II | I

III | IV

All +

S: Sin +, Cos −, tan −

A: Sin +, Cos +, tan +

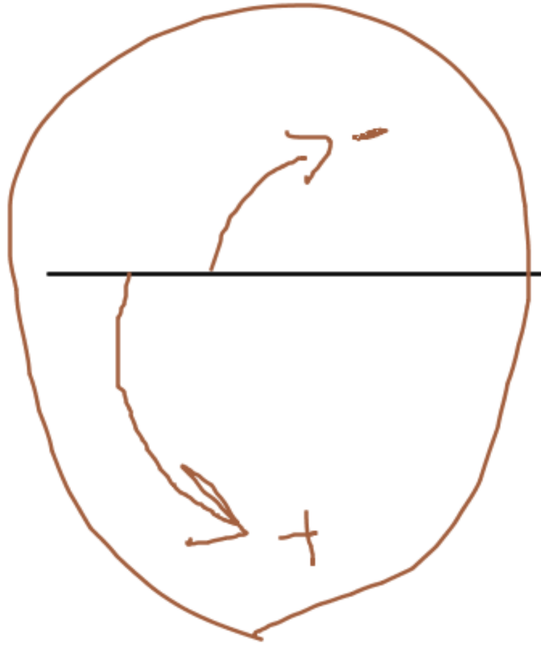
T: Sin −, Cos −, tan +

C: Sin −, Cos +, tan −

$\sin\theta = \sin(180-\theta)$

$\cos\theta = \cos(360-\theta)$

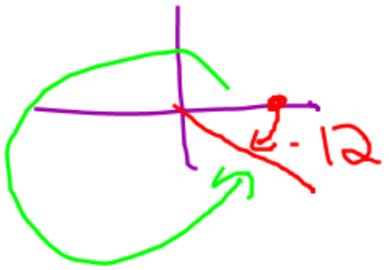
$\tan\theta = \tan(180+\theta)$



tan 290

$\sin 20 = \sin(180-20) = \sin 160$

$\cos 280 = \cos(360-280) = \cos 80$



$\tan 110 = \tan(180+110) = \tan 290$

$\csc 192 = \csc(180-192) = \csc(-12) = \csc 348$

$\sec 18 = \sec(360-18) = \sec 342$

$\cot 215 = \cot(180+215) = \cot 395 = \cot 35$

-360

Each point lies on the terminal arm of angle θ in standard position.

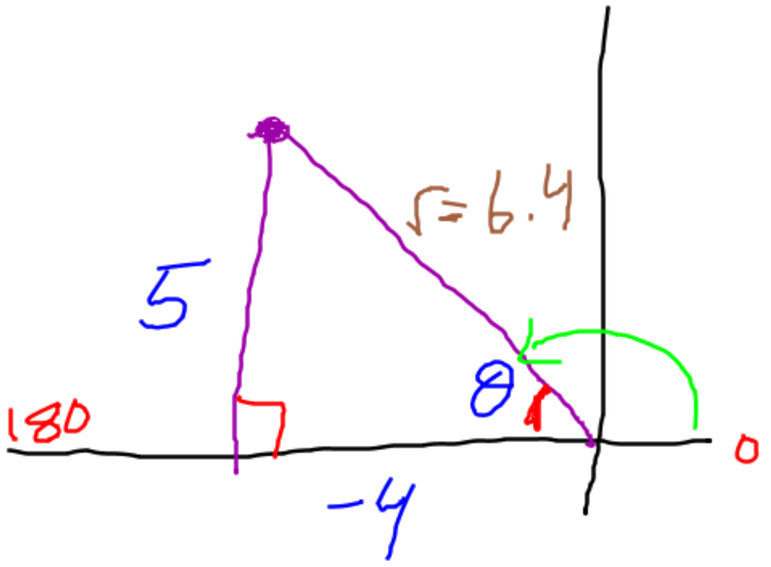
i) Draw a sketch of each angle θ.

ii) Determine the value of r to the nearest tenth.

iii) Determine the primary trigonometric ratios for angle θ.

iv) Calculate the value of θ to the nearest degree.

$(-4, 5)$



$\sin\theta = \frac{5}{6.4} \Rightarrow \theta = \sin^{-1}\left(\frac{5}{6.4}\right)$

$\theta = 51^\circ$

$\cos\theta = \frac{-4}{6.4}$

$\beta = 180 - 51$

$= 129^\circ$

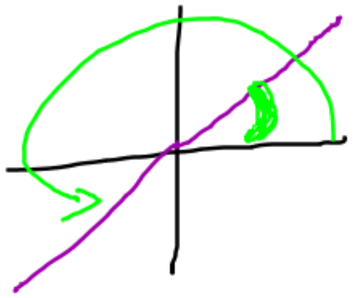
$\tan\theta = \frac{5}{-4}$

$(-4)^2 + 5^2 = 16 + 25 = 41$

$\therefore r = \sqrt{41} = 6.4$

Use each trigonometric ratio to determine ~~all~~ BOTH values of θ, to the nearest degree if $0° \leq \theta \leq 360°$.

S	A
T	C



$\tan\theta = +1.8942$

$\theta = \tan^{-1}(1.8942)$

$\theta = 62^\circ$

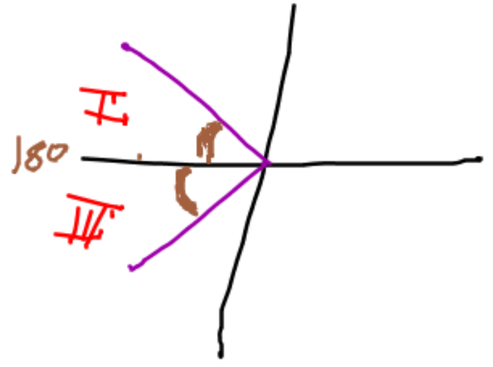
$\beta = 180 + 62$

$= 242^\circ$

$\cos\theta = -0.8931$

$\theta = \cos^{-1}(-0.8931)$

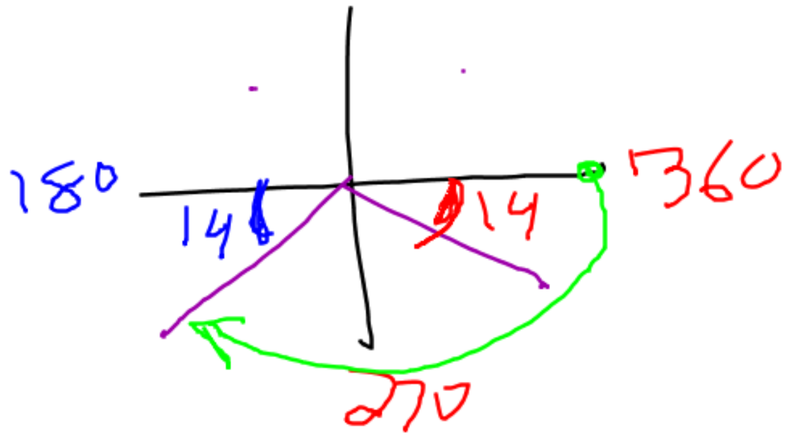
$\theta = 153^\circ$



$\beta = 360 - 153 = 207^\circ$

$$\csc\theta = -4.2103$$

$$\sin\theta = \frac{1}{-4.2103}$$



$$\theta = \sin^{-1}\left(\frac{1}{-4.2103}\right) \approx -14^\circ \Rightarrow 360 - 14 = 346^\circ$$

$$\beta = 180 - 346 = -166$$

$$\beta = 180 - -14 = 194^\circ$$

$$360 - 166 = 194^\circ$$