

Positive Angles

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Click one of the buttons below
or press the enter key

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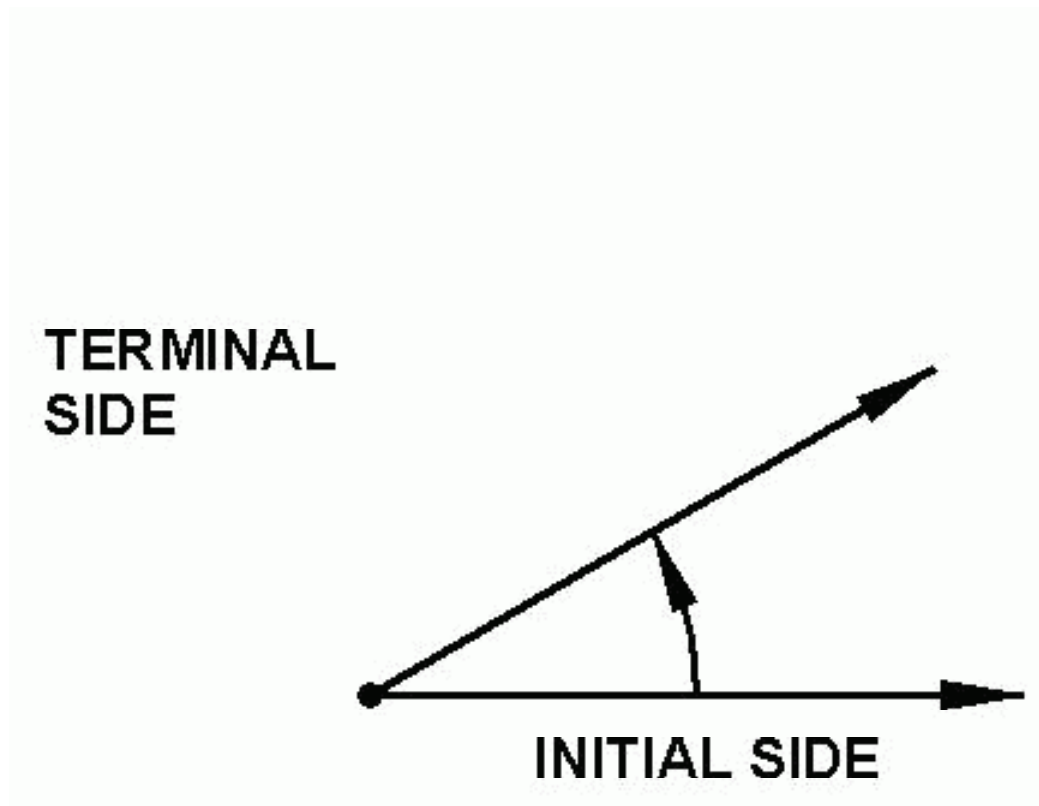
Generating a positive right angle . . .

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Rotate the initial side counter-clockwise ($\frac{1}{4}$ revolution).



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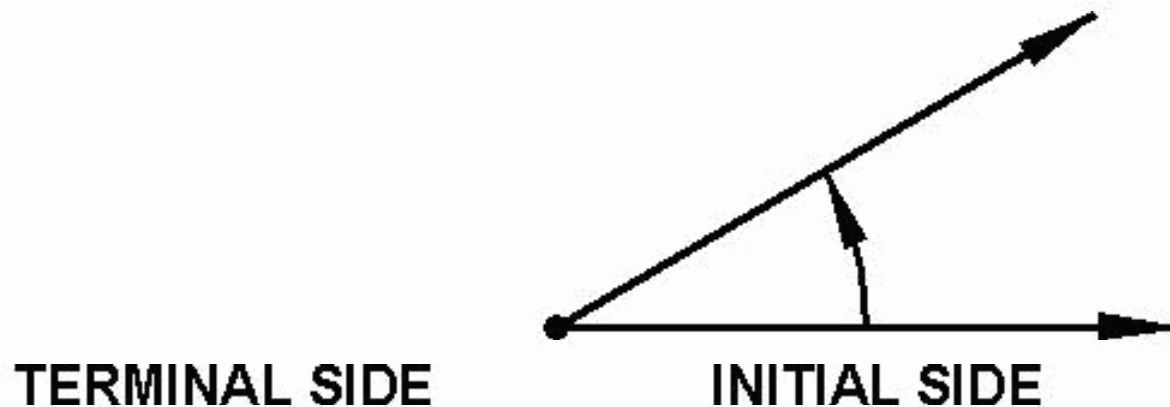
Generating a positive straight angle . . .

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Rotate the initial side counter-clockwise ($\frac{1}{2}$ revolution).



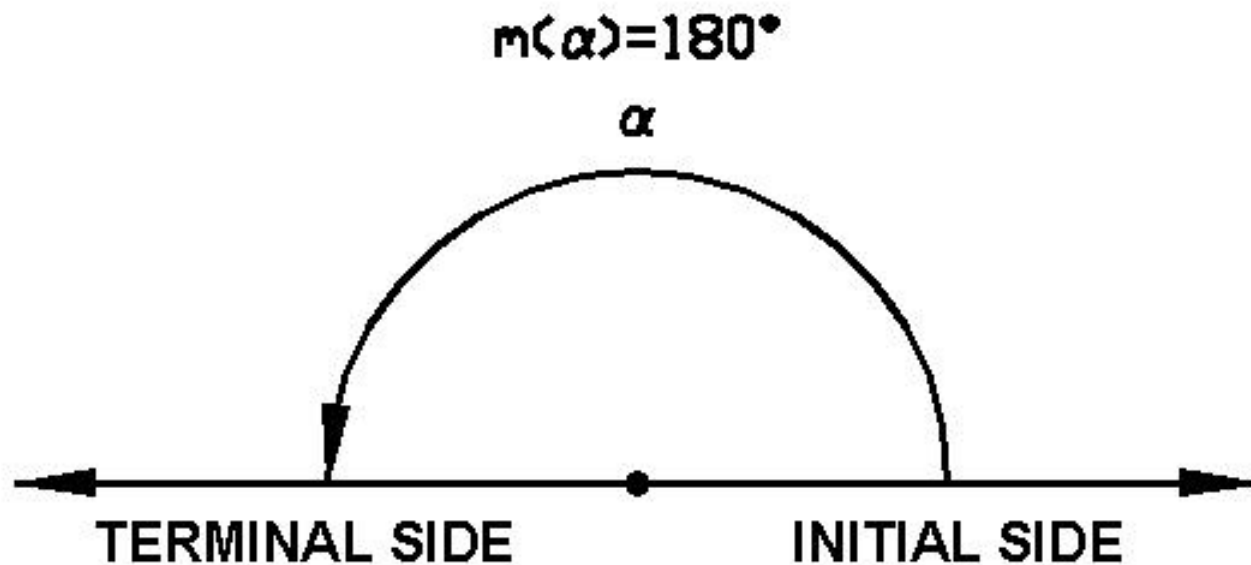
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$$m(\alpha) = 180^\circ$$

Why?



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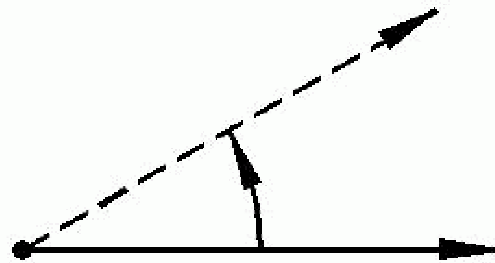
EXIT

1) Rotate $\frac{1}{4}$ revolution ccw

2) Rotate another $\frac{1}{4}$ revolution ccw

You have rotated $\frac{1}{2}$ revolution ccw!

$$90^\circ + 90^\circ = 180^\circ$$



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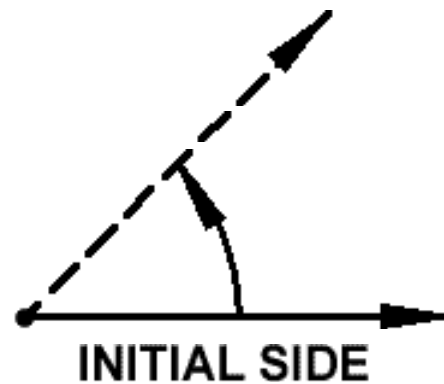
Note: Any angle that measures 180° is called a straight angle.

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Rotate the initial side counter-clockwise $\frac{3}{4}$ revolution.

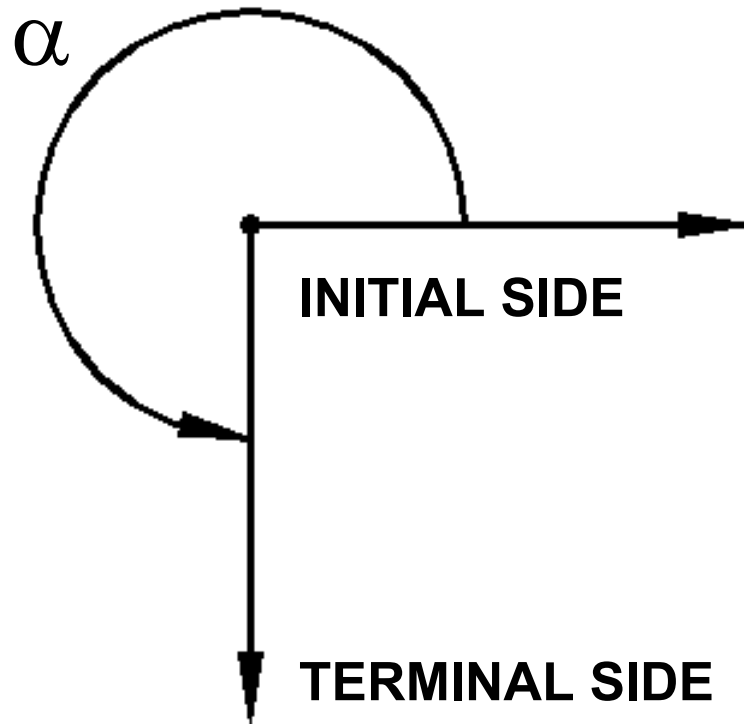


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So that, $m(\alpha) = 90^\circ + 90^\circ + 90^\circ$
 $m(\alpha) = 270^\circ$

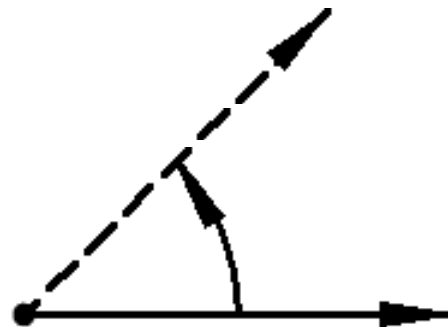


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Rotate the initial side counter-clockwise 1 revolution

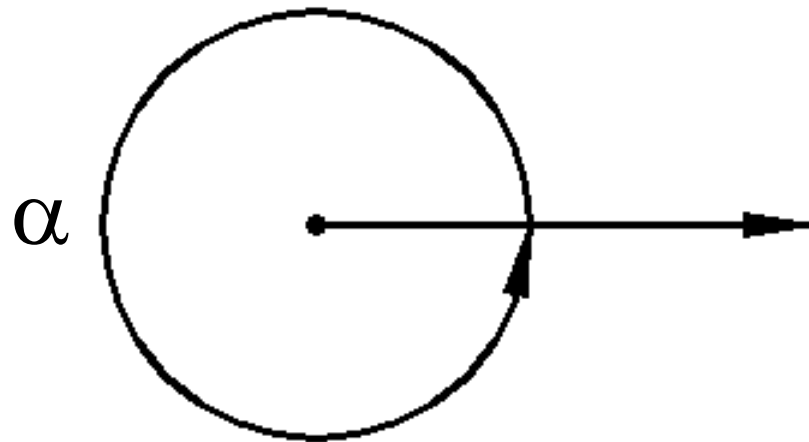


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So that, $m(\alpha) = 90^\circ + 90^\circ + 90^\circ + 90^\circ$
 $m(\alpha) = 360^\circ$



Note: Initial side = terminal side.

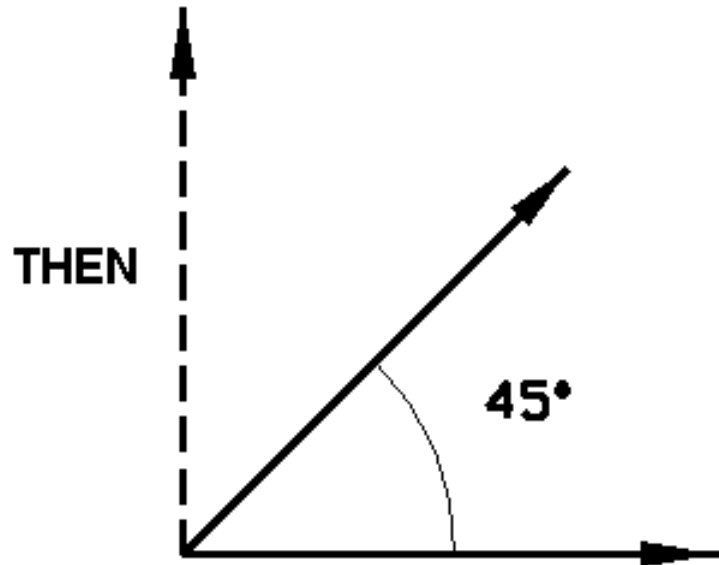
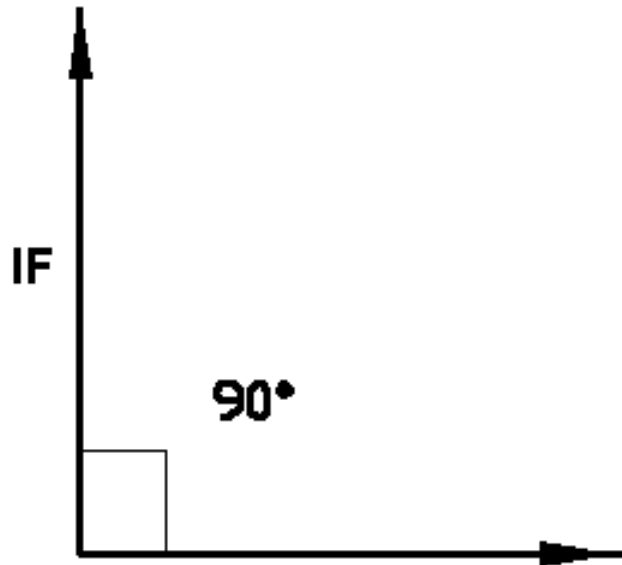
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EXIT

Q: What would a 45° angle look like?

Answer --



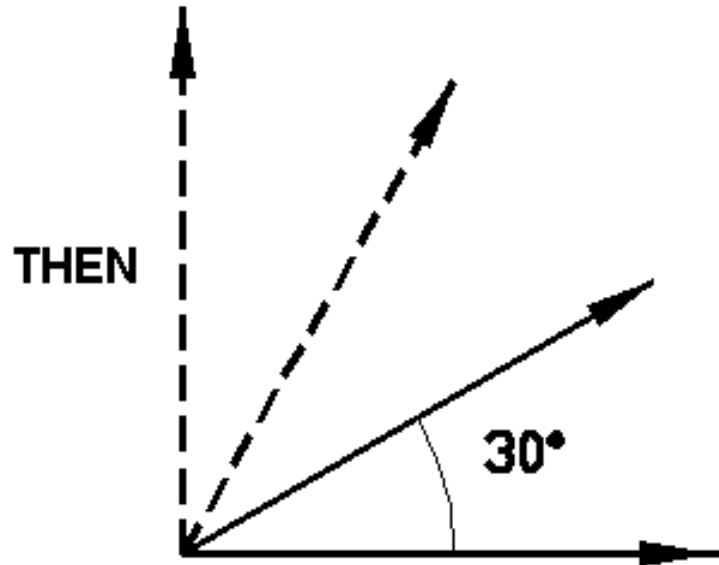
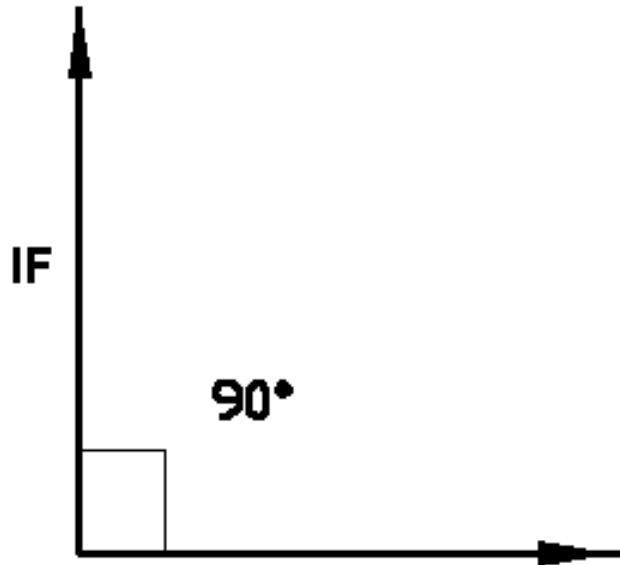
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Q: What would a 30° angle look like?

Answer --

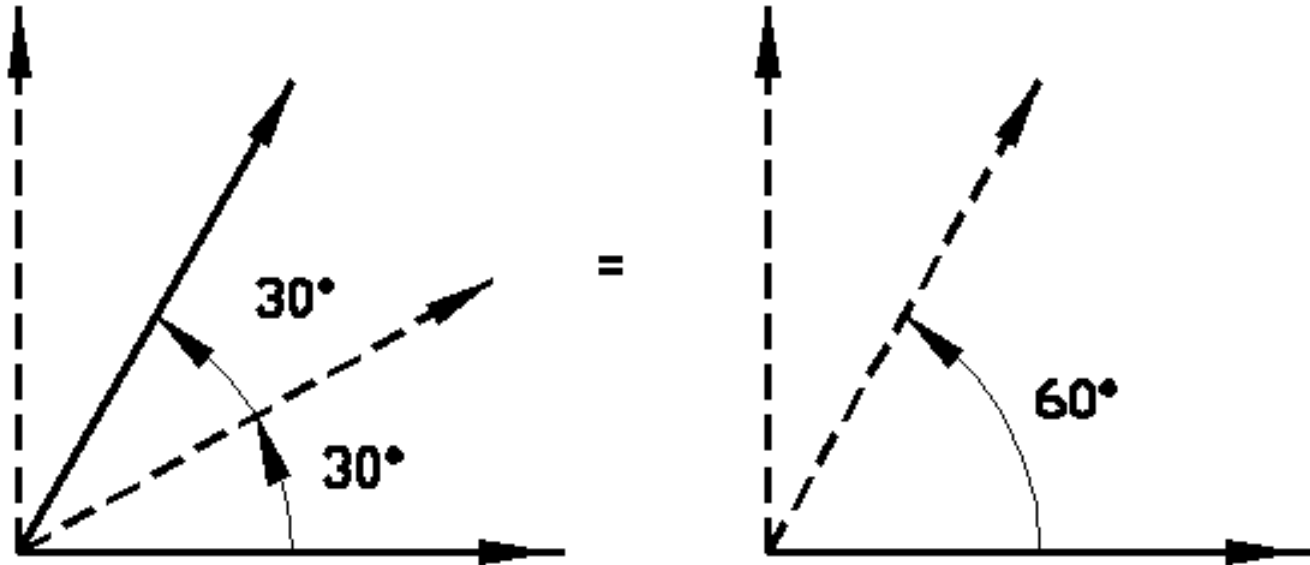


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Note



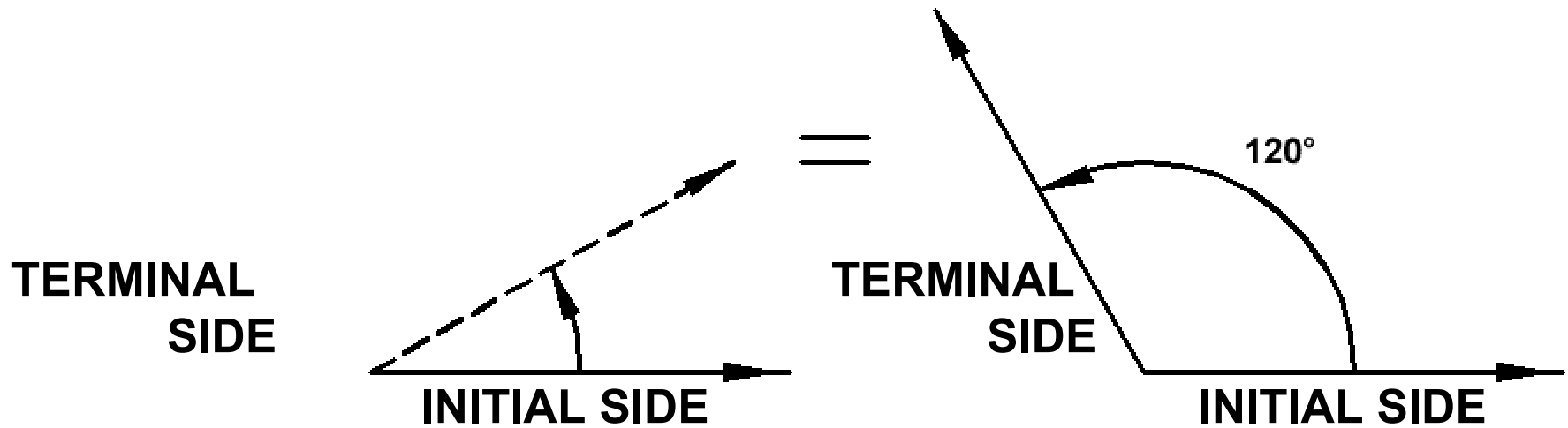
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Q: What would a 120° angle look like?

Answer --



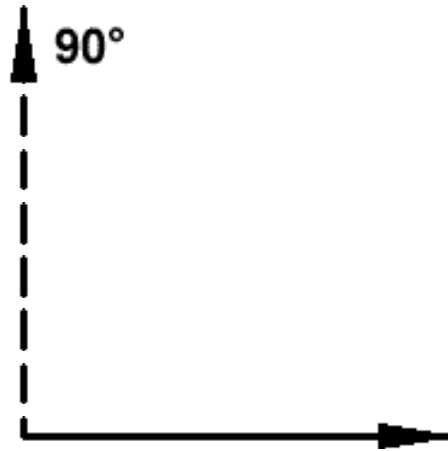
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Note: this procedure can be used to generate the angles

120° , 150° , 180°
 210° , 240° , 270°
 300° , 330° , 360° .



This is why
the system of degrees
is based on a circle!

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Q: Can we ever rotate the initial side counterclockwise more than one revolution?

Answer – YES!

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Note: Complete Revolutions

Rotating the initial side counter-clockwise

1 rev., 2 revs., 3 revs., . . .

generates the angles which measure

360° , 720° , 1080° , . . .

Picture



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In fact,

rotating the initial side counter-clockwise n revolutions (from 0°) generates the angles $n \bullet 360^\circ$

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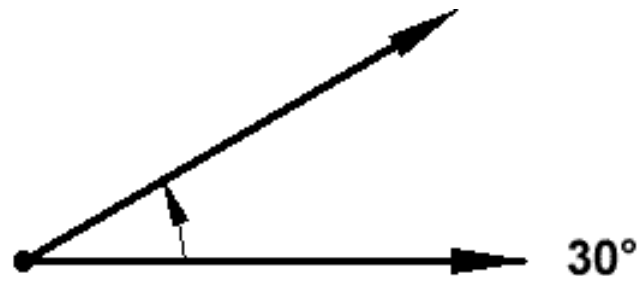
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Q: What if we start at 30° , and now rotate our terminal side 1 complete revolution.

What angle did we generate?

Answer --

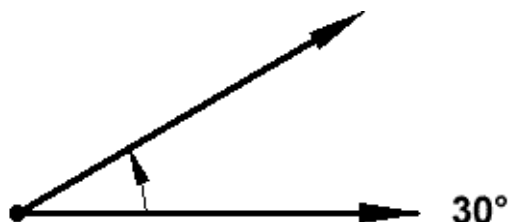


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What if we start at 30° and now rotate our terminal side counter-clockwise 1 rev., 2 revs., or 3 revs.

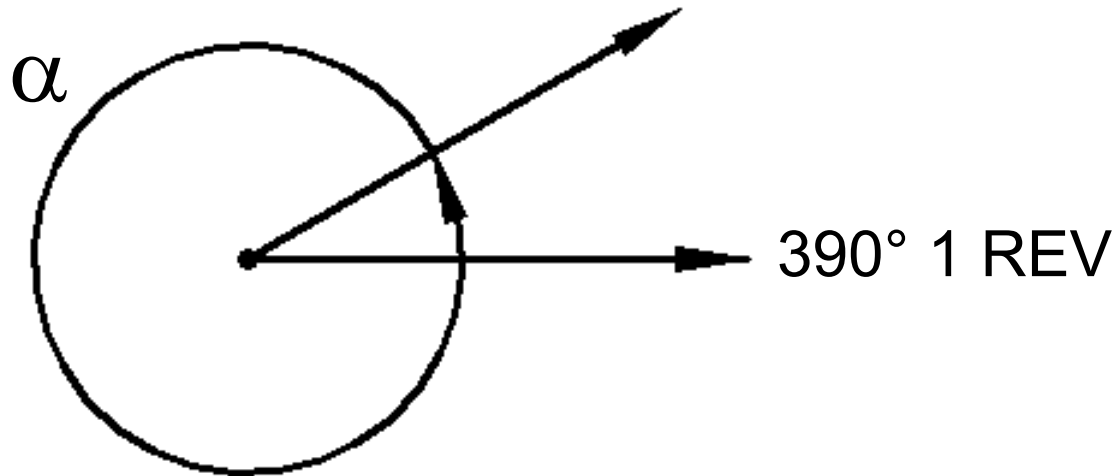


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1 Revolution --



$$m(\alpha) = 30^\circ + 360^\circ$$

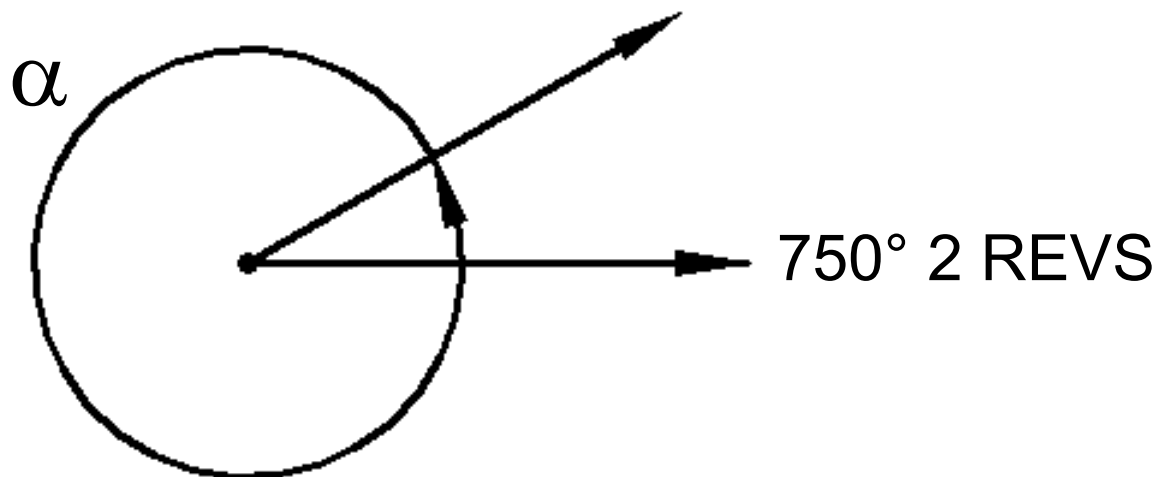
$$m(\alpha) = 390^\circ$$

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2 Revolutions



$$m(\alpha) = 30^\circ + 360^\circ + 360^\circ$$

$$m(\alpha) = 30^\circ + 2 \cdot 360^\circ$$

$$m(\alpha) = 30^\circ + 720^\circ$$

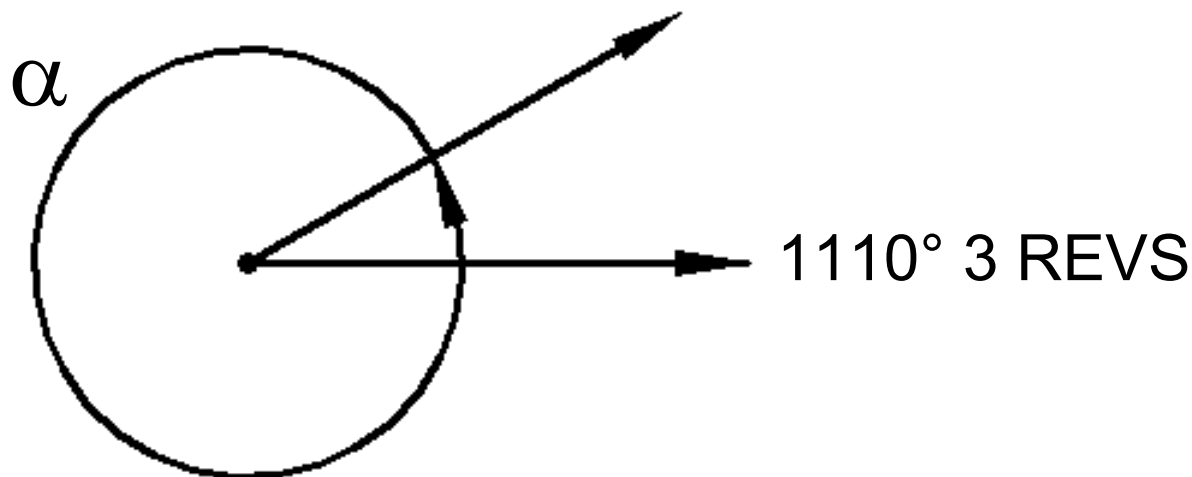
$$m(\alpha) = 750^\circ$$

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3 Revolutions



$$m(\alpha) = 30^\circ + 360^\circ + 360^\circ + 360^\circ$$

$$m(\alpha) = 30^\circ + 3 \bullet 360^\circ$$

$$m(\alpha) = 30^\circ + 1080^\circ$$

$$m(\alpha) = 1110^\circ$$

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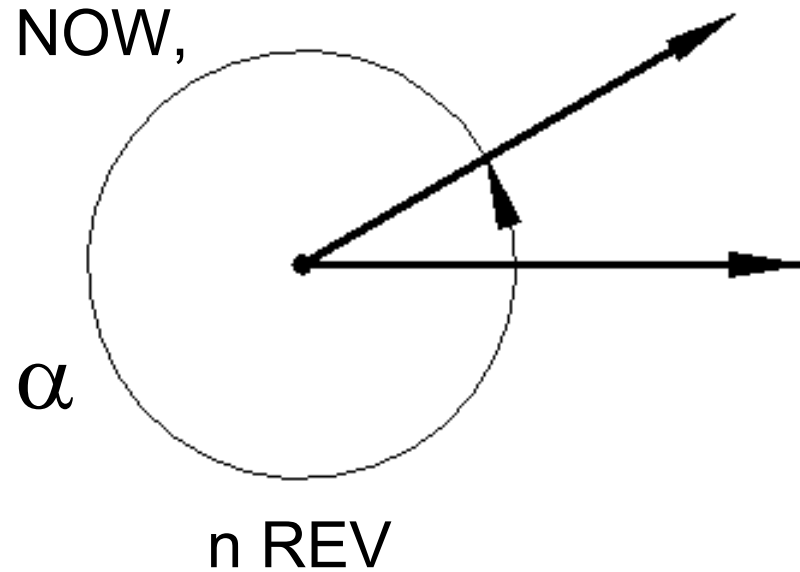
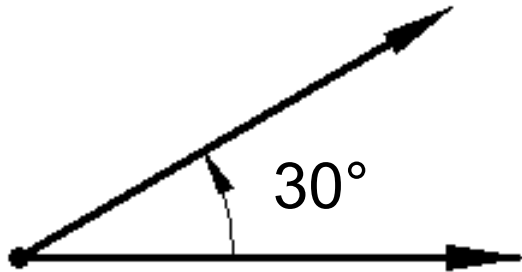
Q: What if we start at 30° and rotate counterclockwise n revolutions?
What angle does this generate?

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Answer --



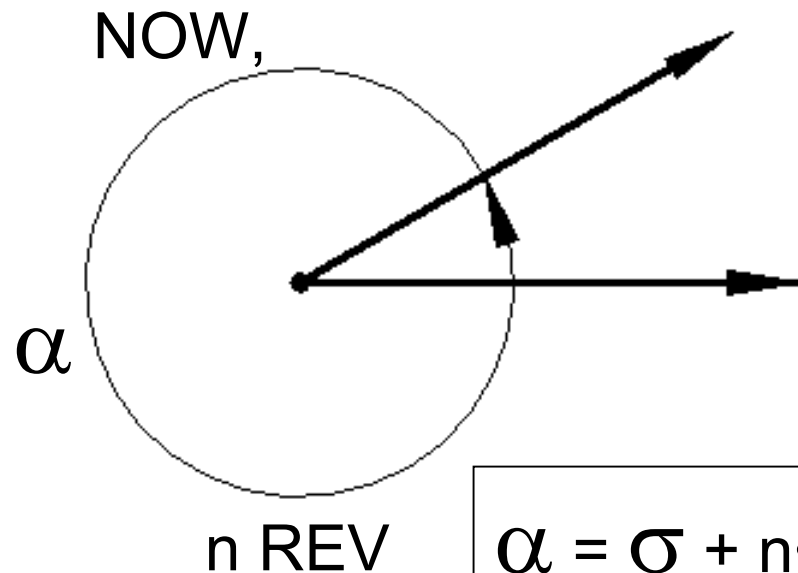
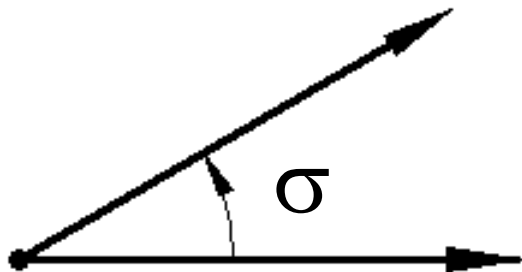
$$m(\alpha) = 30^\circ + 360^\circ \cdot n$$

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We can generalize this procedure.
Let's start at an angle σ , then rotate
 n rev counterclockwise. What
formula is generated?



$$\alpha = \sigma + n \cdot 360^\circ$$

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Definition: Coterminal Angles

Angles α and σ are said to be
coterminal
if

$$\alpha = \sigma + n \bullet 360^\circ$$

Example–

The following angles are coterminal:

$0^\circ, 360^\circ, 720^\circ, 1080^\circ, \dots$ coterminal

$30^\circ, 390^\circ, 750^\circ, 1110^\circ, \dots$ coterminal

$45^\circ, 405^\circ, 765^\circ, 1125^\circ, \dots$ coterminal

$60^\circ, 420^\circ, 780^\circ, 1140^\circ, \dots$ coterminal

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End of Positive Angles

Title V

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