

Class_07 Sep 29 More Angles

Wednesday, September 28, 2022 3:28 PM

Tonight's Class:

- **Unit 1 Test**
- **National Day for Truth and Reconciliation**
- **4.1 More with Angles**

Please:

1. **Make sure your name is on the Chapter 3 Hand-in worksheet and hand it in.**
2. **Put away all your materials, except for your calculator & something to write with.**
3. **If you're planning on using Desmos for the test, go to the app but **WAIT to enter test mode**. Once everybody is ready, we'll go in at the same time, and I'll come by to check you're locked into test mode.**
4. **On your test, write clearly and show all necessary steps. When you are finished, please look over your work before handing in the test. **If you're using Desmos on your phone, don't exit test mode yet**. When I get your test, I'll ask you to exit, so I can look at your phone and write down how long you were on the app.**
5. **While other people are finishing, respect them by being quiet. You can leave the classroom if you wish, but be back in time for the rest of class. We'll start new material after the test.**



I respectfully acknowledge that I live, learn and work on the unceded traditional territories of the Matsqui, Katzie, Kwantlen, and Semiahmoo First Nations.

Orange Shirt Day on September 30 is now known as the National Day for Truth and Reconciliation. In response to Call #80 of the Truth and Reconciliation: Calls to Action, it is a day to honour survivors, their families, and communities, and to learn about and reflect on the history of residential schools and the ongoing impacts these schools have had on First Nation's communities to this day.

The Truth and Reconciliation Report called Residential schools "a systematic, government-sponsored attempt to destroy Aboriginal cultures and languages and to assimilate Aboriginal peoples so that they no longer existed as distinct peoples." Removing children from their families and forcing them to attend residential schools was Canadian government policy, in what has been recognized as attempted cultural genocide.

Between the 1870s and 1996, more than 150,000 Indigenous, Métis and Inuit children attended residential schools - seven generations of Indigenous people over the course of 150 years. Official records show that 4,100 of those children never returned home. Since the 215 unmarked graves were found in Kamloops in 2021, over 6000 more graves have been identified at residential schools across the country, with more anticipated.

<https://www.crd.bc.ca/project/first-nations-relations/truth-and-reconciliation>

Whiteboard - Trig warm-up

Flour

Wheat bran

Baking powder

Margarine

Sugar

Brown sugar

Egg

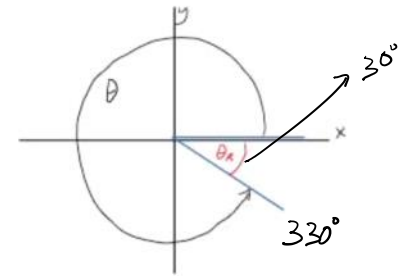
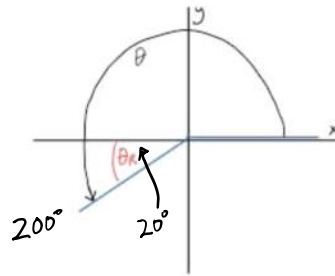
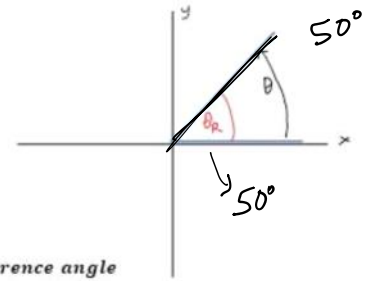
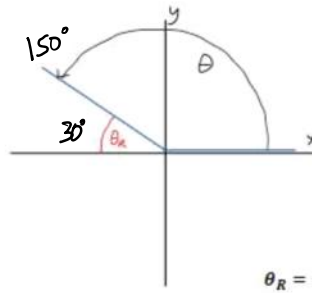
Vanilla

Oats

Cranberries

reference angle θ_R of a standard position angle θ

- is the smallest angle formed between the terminal arm of θ and the x-axis
- is positive



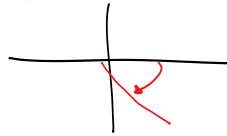
Try this

1. Draw each angle in standard position. (Estimate – you don't need to use a protractor.)

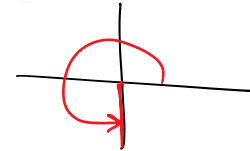
a) 110°



b) -40°



c) 270°



2. Find a positive and a negative coterminal angle to the angle 160° .

$$160^\circ + 360^\circ = 520^\circ$$

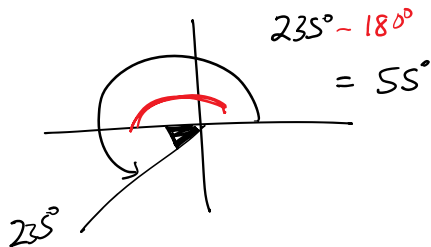
$$160^\circ - 360^\circ = -200^\circ$$

3. Give the general expression for ALL angles coterminal to the angle 25° .

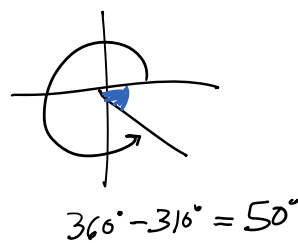
$$25^\circ + 360^\circ n, n \in \mathbb{I}$$

4. Find the reference angle for each angle.

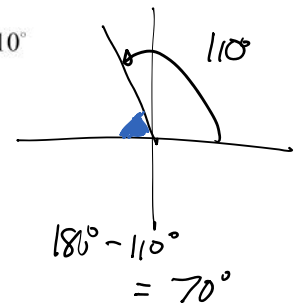
a) 235°

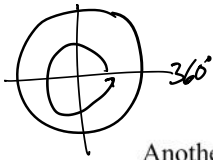


b) 310°



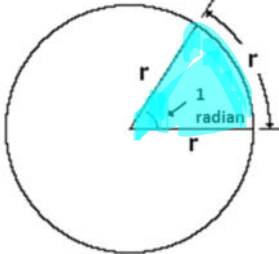
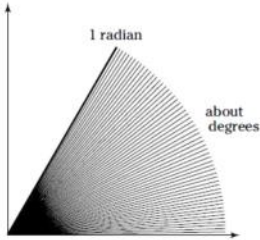
c) 110°





Another unit used to measure angles (besides degrees) is **radians**. We need to know how to work with radians, as they make some calculus questions much easier (and this is PreCalculus, after all!)

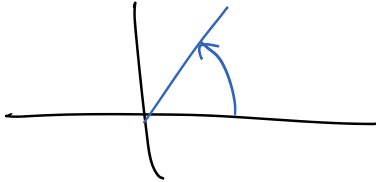
1 radian = the measure of an angle that cuts off a length on the circle equal in length to the circle's radius.

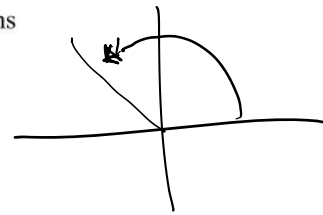
Try this

Sketch a standard position angle measuring:

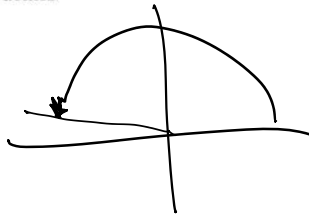
a) 1 radian



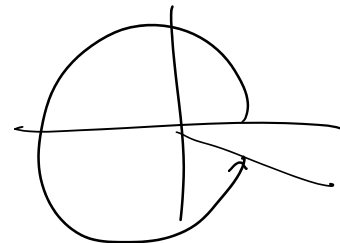
b) 2 radians



c) 3 radians



b) 6 radians

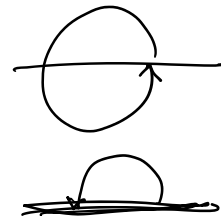


How many radians are in a full rotation? (Think about how many radius lengths will fit onto the full circumference of a circle.)

$$C = 2\pi r$$

$$2\pi \text{ radians} = \text{a complete rotation} = 360^\circ$$

$$\pi \text{ radians} = \text{a straight angle} = 180^\circ$$



Common Angles

Some angles are used so frequently that it is very helpful to simply KNOW their measurement in both radians and degrees.

$$\begin{array}{llll} \pi = 180^\circ & 2\pi = 360^\circ & \frac{\pi}{2} = 90^\circ & \frac{\pi}{3} = 60^\circ \\ \frac{\pi}{4} = 45^\circ & \frac{\pi}{6} = 30^\circ & 0 = 0^\circ & \frac{3\pi}{2} = 270^\circ \\ & & & \frac{3 \times 180^\circ}{2} \uparrow \end{array}$$

Converting Units

We know that 30 minutes is the same thing as $\frac{1}{2}$ an hour. But what about 7452 minutes. What is that, in hours? Here's one way to change units – multiply by a factor of "1"

$$7452 \text{ minutes} \times \left(\frac{1 \text{ hour}}{60 \text{ minutes}} \right) = \frac{7452}{60} = 124.2 \text{ hours}$$

Converting Angle Measure

For angles that are not the common ones listed above, we convert angle measurements between degrees and radians by multiplying by the appropriate conversion unit.

$$(\text{degrees}) \times \left(\frac{\pi}{180} \right) = \text{radians}$$

$$(\text{radians}) \times \left(\frac{180}{\pi} \right) = \text{degrees}$$

Try these

$$22^\circ \times \left(\frac{\pi}{180} \right) = \frac{22\pi}{180} = \frac{11\pi}{90} \quad \text{approx. form } 22^\circ \times \frac{\pi}{180} = 0.38 \text{ radian}$$

Convert from degrees to radians. Express answer correct to 2 decimal places.

425°

$$425^\circ \times \left(\frac{\pi}{180} \right) = 7.42 \text{ radians}$$

Convert from degrees to radians. Leave answer as a simplified fraction, in terms of π .

-330°

$$-330^\circ \times \left(\frac{\pi}{180} \right) = \frac{-330\pi}{180} = -\frac{33\pi}{18} = -\frac{11\pi}{6}$$

Convert from radians to degrees.

a) $\frac{3\pi}{8}$

$$\frac{3\pi}{8} \times \left(\frac{180}{\pi} \right) = \frac{3 \times 180}{8} = 67.5^\circ$$

b) 2 radians

$$\frac{2}{1} \times \frac{180}{\pi} = \frac{360}{\pi} = 114.59^\circ$$

For next class - practice these things!

More practice

4.1 TB p 175: 1, 3-5(ace), 6, 7ab, 8ac, 9ab

Worksheets (posted on website):

Trigonometry Practice #1, 3



If you find factoring trinomials difficult, please try the Factoring Worksheets I've posted on the website (PreCalculus 12 Home Page). Being able to factor is helpful in this unit, too.