

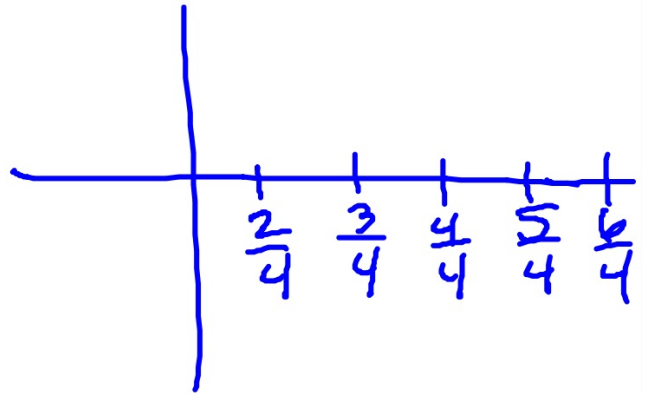
$$12.) y = 4\cos(2\pi x - \pi) - 1$$

$$P = \frac{2\pi}{2\pi} = 1$$

$$PS: 2\pi x - \pi = 0$$

$$x = \frac{1}{2}$$

$$I: \frac{1}{4}$$

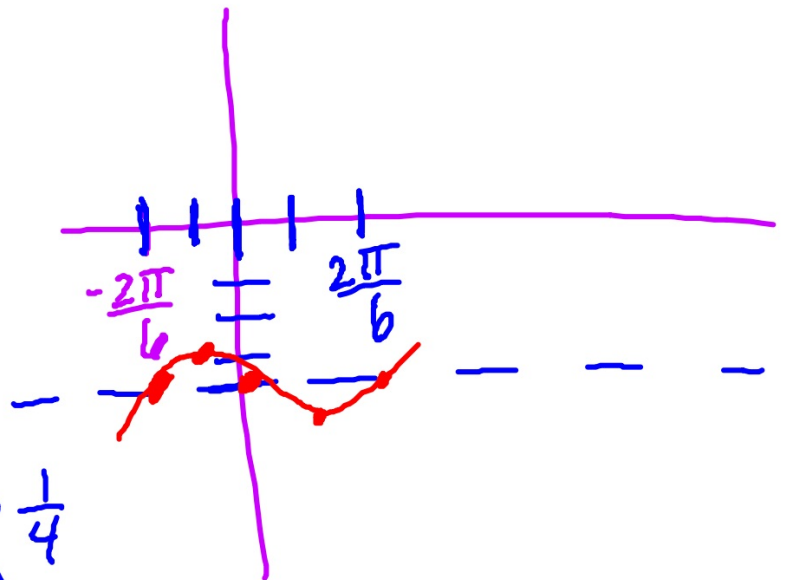


$$9.) y = \sin(3x + \pi) - 4$$

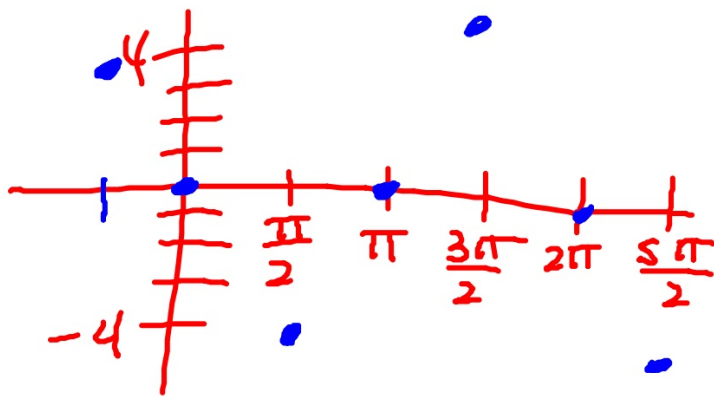
$$PS: x = -\frac{\pi}{3}$$

$$P = \frac{2\pi}{3}$$

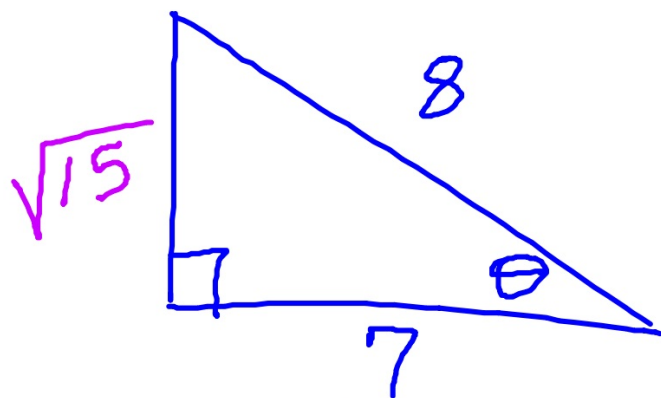
$$I = \frac{\frac{2\pi}{3}}{\frac{1}{4}} = \frac{2\pi}{3} \cdot \frac{1}{4} = \frac{\pi}{6}$$



13.) ~~5.)~~  $A=4$



$$-4 \cos\left(x - \frac{\pi}{2}\right)$$



$$\sin \theta = \frac{\sqrt{15}}{8}$$

$$\cos \theta = \frac{7}{8}$$

$$\tan \theta = \frac{\sqrt{15}}{7}$$

$$\csc \theta = \frac{8}{\sqrt{15}} = \frac{8\sqrt{15}}{15}$$

$$\sec \theta = \frac{8}{7}$$

$$\cot \theta = \frac{7}{\sqrt{15}} = \frac{7\sqrt{15}}{15}$$

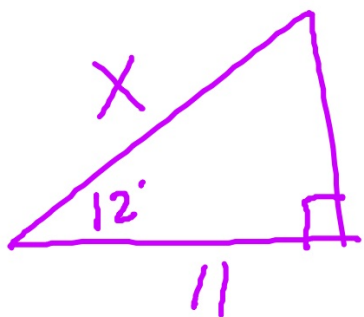
## Calculator

$$\sin(492^\circ)$$

.743

$$\sec\left(\frac{11\pi}{7}\right) = \frac{1}{\cos\left(\frac{11\pi}{7}\right)}$$

4.494



$$\cos 12^\circ = \frac{11}{X}$$

$$X = \frac{11}{\cos 12^\circ}$$

11.246

$$\frac{19\pi}{12} \rightarrow$$

$$\frac{19\pi}{12} \cdot \frac{180}{\pi}$$

$$285^\circ$$

$$450^\circ \rightarrow$$

$$450^\circ \cdot \frac{\pi}{180} = \frac{5\pi}{2}$$

Coterminal

$$100^{\circ} + 360^{\circ} = 460^{\circ}$$

$$100^{\circ} - 360^{\circ} = -260^{\circ}$$

Arc length

$$S = r\theta$$

↑  
radians

$$r = 20; \theta = 150^\circ$$

$$S = (20)\left(\frac{5\pi}{6}\right)$$

$$S = \frac{100\pi}{6} = \frac{50\pi}{3}$$

Area

$$A = \frac{1}{2}r^2\theta$$

↑  
radians

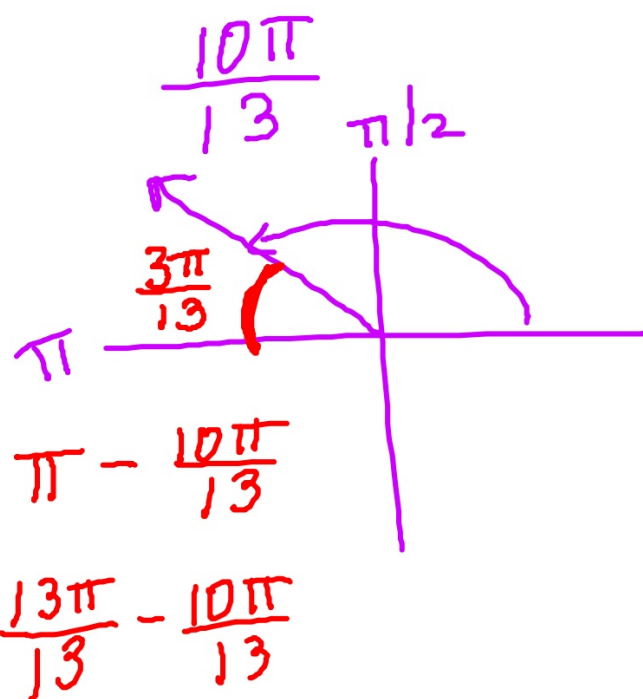
$$r = 3; \theta = \frac{\pi}{4}$$

$$A = \frac{1}{2}(3)^2 \frac{\pi}{4}$$
$$= \frac{9\pi}{8}$$



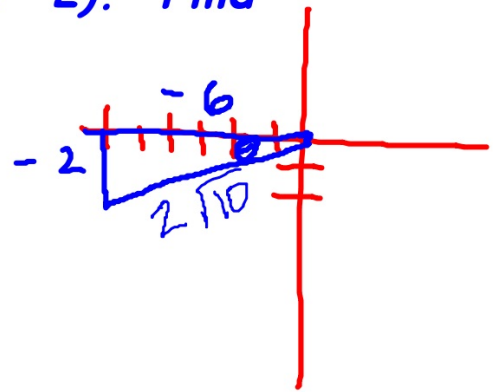
## reference angles

$310^\circ$



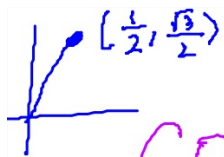
Let  $\theta$  be an angle in standard position whose terminal side passes through  $(-6, -2)$ . Find

$$\sin \theta = \frac{-2}{2\sqrt{10}} = \frac{-\sqrt{10}}{10}$$



$$\tan \theta = \frac{1}{3}$$

$$\sec \theta = \frac{2\sqrt{10}}{-6} = \frac{\sqrt{10}}{-3}$$



$$\cot + \frac{2\pi}{3}$$

$$-\frac{\sqrt{3}}{3}$$

$$\sin\left(-\frac{\pi}{3}\right)$$

$$-\frac{\sqrt{3}}{2}$$

$$\cos(-\pi)$$

$$-1$$

$$\sec\left(\frac{3\pi}{4}\right)$$

$$-\sqrt{2}$$

$$\tan\left(-\frac{\pi}{4}\right)$$

$$-1$$

$$\csc(0)$$

undefined

$$y = -2 \sin(2x - \pi) + 1$$

**Amplitude** 2

**Midline**  $y = 1$

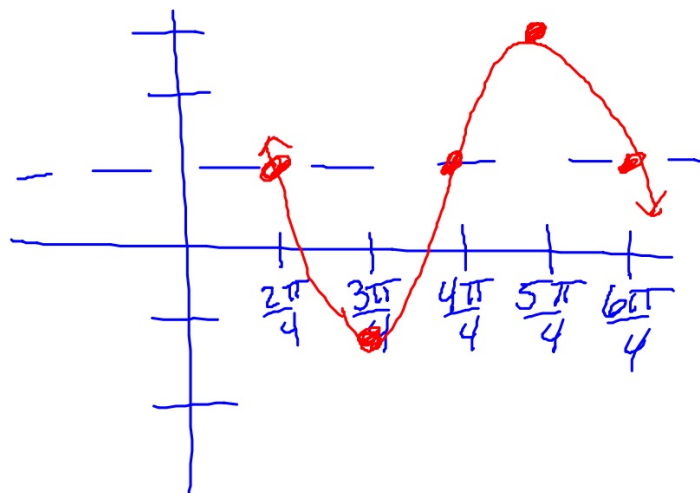
**Phase Shift**  $x = \frac{\pi}{2}$

**Period**  $\pi$

**Increment**  $\frac{\pi}{4}$

**Domain**  $(-\infty, \infty)$

**Range**  $[-1, 3]$



## Introduction to Probability & Statistics

**A BOOK ON  
PROBABILITY?  
IT MIGHT BE ON THAT  
SHELF OVER THERE.**





- 
- Ch 9/10 Review WKST (OMIT #38)
  - Simple Probability WKST (ODDS ONLY)
  - Intro to Stats WKST (ODDS ONLY)

## Vocabulary

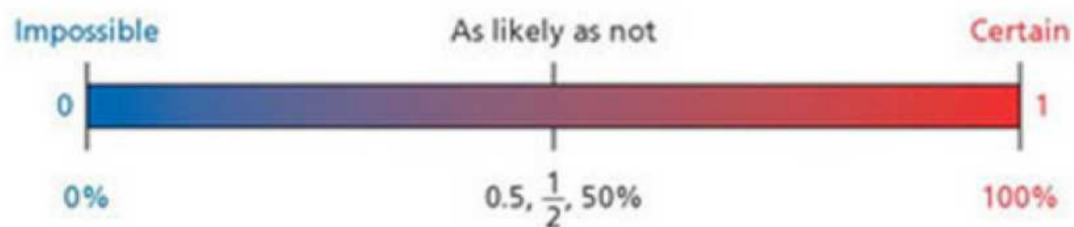
- Probability - the measure of how likely an even is to occur
- Outcome - possible result of an experiment
- Event - set of desired outcomes
- Sample Space - set of all possible outcomes

## Sample Spaces

Experiment	Rolling a number cube 	Spinning a spinner 
Sample Space	1, 2, 3, 4, 5, 6	Blue, Yellow, Green Red



Probabilities can be expressed as fractions (between 0 and 1) or as a percent (between 0% and 100%)



- Equally likely outcomes - outcomes that have the same chance of occurring
- Favorable outcomes - desired outcome (event)

## Theoretical Probability

\*for EQUALLY LIKELY outcomes only

$$P(\text{event}) = \frac{\text{\# of favorable outcomes}}{\text{\# of outcomes in the sample space}}$$

ex 1: A CD has 5 upbeat songs and 7 slow ballads. What is the probability that a randomly selected song is an upbeat dance song?

$$\frac{5}{12}$$

***A die is rolled and a coin is tossed.***

a) What is the sample space

1	H
2	H
3	H
4	H
5	H
6	H

1	T
2	T
3	T
4	T
5	T
6	T

ex 2: A red dice and a blue dice are rolled.

b) What is the probability that the sum is 10?

$$\frac{3}{36} = \frac{1}{12}$$

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

ex 2: A red dice and a blue dice are rolled.

c) What is the probability that the sum is 6?

$$\frac{5}{36}$$

ex 2: A red dice and a blue dice are rolled.

d) What is the probability that the difference is 6?



ex 2: A red dice and a blue dice are rolled.

e) What is the probability that the red cube is greater?

$$\frac{15}{36} = \frac{5}{12}$$

	1	2	3	4	5	6	R
1		✓	✓	✓	✓	✓	
2			✓	✓	✓	✓	
3				✓	✓	✓	
4					✓	✓	
5							
6							



ex 3: A quarter, nickel and penny are flipped.

a) What is the sample space?

Q	N	P
H	H	H
H	H	T
H	T	H
H	T	T
T	T	T
T	H	T
T	T	H
T	H	H

$$(2)^3$$

ex 3: A quarter, nickel and penny are flipped.

b) Find the probability that the quarter shows heads.

$$\frac{1}{2}$$

ex 3: A quarter, nickel and penny are flipped.

c) Find the probability that the penny and nickel show heads. ~~Find the probability that one coin shows heads.~~

$$\frac{1}{4}$$

ex 3: A quarter, nickel and penny are flipped.

d) Find the probability that <sup>only</sup> one coin shows heads.

$$\frac{3}{8}$$

ex 3: A quarter, nickel and penny are flipped.

e) Find the probability that all three coins land the same way.

$$\frac{2}{8} = \frac{1}{4}$$

## Experimental Probability

$$\text{Experimental Probability} = \frac{\text{\# of times an event occurs}}{\text{\# of trials}}$$

ex 4:

Spinner Experiment			
Color	Red	Green	Blue
Spins	5	8	7

a) What is the probability of spinning red?

$$\frac{1}{3}$$



ex 4:

Spinner Experiment			
Color	Red	Green	Blue
Spins	5	8	7

b) What is the experimental probability of spinning red?

$$\frac{5}{20} = \frac{1}{4}$$



ex 4:

Spinner Experiment			
Color	Red	Green	Blue
Spins	5	8	7

c) What is the probability of spinning green or blue?

$$\frac{2}{3}$$

ex 4:

Spinner Experiment			
Color	Red	Green	Blue
Spins	5	8	7

d) What is the experimental probability of spinning green or blue?

$$\frac{15}{20} = \frac{3}{4}$$

## Populations and Samples

- Population - a group of people or objects that you want information about.
- Sample - a subset of the population
- Biased Sample - a sample that misrepresents the population
- Statistic - numbers that summarize data from a sample
- Parameter - numbers that summarize data for an entire population

ex 4: Identify the population and the sample.

a) A quality control inspector needs to estimate the number of defective computers in a group of 250 computers. He tests 25 randomly chosen computers.

***Population: 250 computers***

***Sample: 25 computers***

b) The manager of the human resources department at a company wants to know if any of the company's 281 employees would take advantage of a reduced membership to a health club. The manager surveys 70 randomly chosen employees.

***Population: 281 employees***

***Sample: 70 employees***

ex 5: In a survey of 50 students at a high school, 32 students said they plan to attend the homecoming dance. The school has 720 students.

a) Which of these numbers is a statistic, and which is the parameter?

***Statistic: 32/50***

***Parameter: not here***

b) Predict the number of students who plan to attend the homecoming dance.

$$\frac{32}{50} = \frac{x}{720} ; x = 460.8$$

## Experiments and Observational Studies

- Experiment - a study where a treatment is imposed
- Observational Study - a study that involves observing

ex 6: State whether each situation represents an experiment or an observational study.

a) A researcher asks students the average number of hours of sleep they get per night and examines whether the amount of sleep affects students' grades.

*Observational (not giving them anything)*

b) A park employee wants to know if latex paint is more durable than non-latex paint. She paints 50 benches with latex paint and 50 benches with non-latex paint.

*Experiment (the treatment is the different types of paint)*