Name: _____

Class: _____

Due Date: _____

Physics Topic 2 - Distance, Displacement, Speed, Velocity, and Acceleration

Understandings

- Zero dimensions
- One dimension
- Two dimensions
- Three dimensions
- Four dimensions
- Position
- Distance
- Displacement
- Speed
- Velocity
- Instantaneous speed
- Instantaneous velocity
- Acceleration
- Projectile motion

Part 1: Answer the following questions. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

1. C: What is the meaning of *zero dimensions*? *One dimension*? *Two dimensions*? *Three dimensions*? *Four dimensions*? If possible draw a figure for each.

2. C: Define *position.*

3. C: Define *distance*. Scalar or vector? Units? Example? Can *distance* be negative?

4. C: Define *displacement*. Scalar or vector? Units? Example? Can *displacement* be negative?

5. C: Define *speed*. Scalar or vector? Equation? Units? Example? Can *speed* be negative?

6. C: Define *velocity*. Equation? Units? Example? Can *velocity* be negative?

7. C: Define *average speed*. Scalar or vector? Equation? Units?

8. C: Define *average velocity*. Scalar or vector? Equation? Units?

9. E: An object moves in a circle with a radius of 3.00 m. It takes the object 4.00 s to complete one revolution.

a. What is the average speed and the average velocity of the object after it completes **one** cycle/revolution?

b. What is the average speed and the average velocity of the object after it completes **one-half** cycle/revolution?
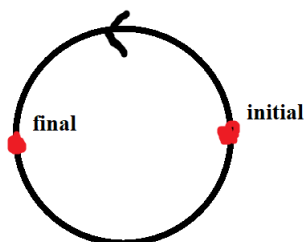
10. E: An object starts from rest at point A and then travels to point B by moving north 1.00 m, then east 5.00 m, and finally south 1.00 m in a total time of 14.0 s. What is the *average speed* and the *average velocity* of the object when it moves from point A to point B?
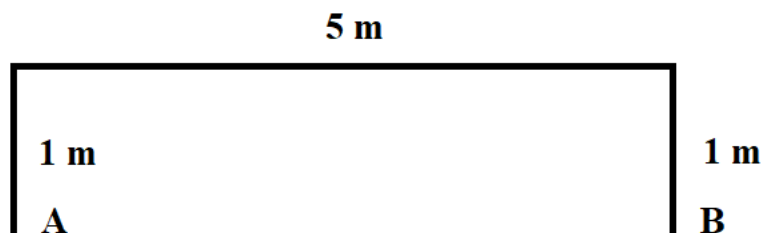
11.C: Define *instantaneous speed*. Example?

12.C: Define *instantaneous velocity*. Example?

13.C: Define *acceleration*. Equation? Units? Example?   Can *acceleration* be negative?

14.C: What is the magnitude of the acceleration of free fall $\vec{g}$ near the surface of the Earth? Which direction/way does it point? Is it positive or negative?

15.C: Define *projectile motion.*

16.C: What does the slope of a *displacement vs. time* graph tell us? Equation? Units?

17.C: What does the slope of a *velocity vs. time* graph tell us? Equation? Units?

18.C: What does the slope of an *acceleration vs. time* graph tell us? Equation? Units?

19.C: What does the area under a *displacement vs. time* graph tell us? Units?
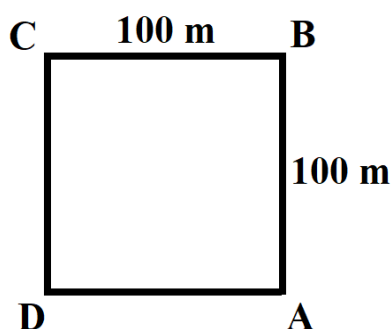
20.C: What does the area under a *velocity vs. time* graph tell us? Units?

21.C: What does the area under an *acceleration vs. time* graph tell us? Units?

22.C: How would you go about determining the acceleration due to gravity near the surface of the Earth? Which equation will you use? Which instruments do you need? What will you do?

Part 2: Determine distance, displacement, speed, and velocity. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

1. E: Wayde Van Niekerk from Russia runs 400. meters at a constant speed around a square track in a time of 43.03 s beginning at point A in a counterclockwise direction as shown below.

```
C      100 m      B
 ┌─────────────────┐
 │                 │
 │                 │ 100 m
 │                 │
 │                 │
 └─────────────────┘
D                   A
```

Complete the following table by determining the distance, displacement, speed, and velocity of Wayde Van Kiekerk at the following points. State both the magnitude and direction for the displacement and velocity of Wayde Van Kiekerk.

	Point B	Point C	Point D	Point A
Total Distance				
Total Displacement				
Average Speed				
Average Velocity				

2. E: Wayde Van Niekerk from Russia runs 400. meters at a constant speed around a rectangular track in a time of 43.03 s beginning at point A in a counterclockwise direction as shown below.
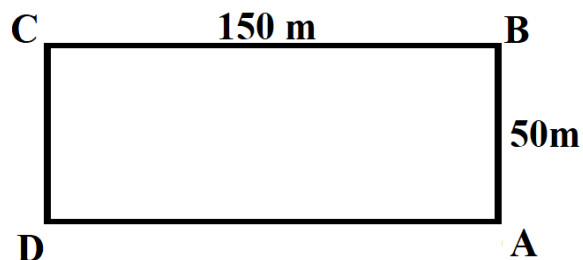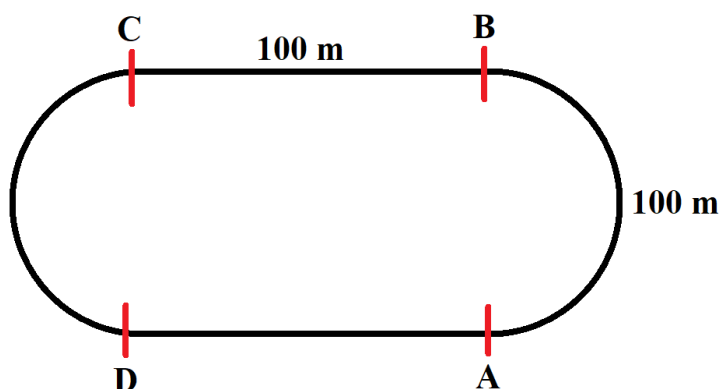

Complete the following table by determining the distance, displacement, speed, and velocity of Wayde Van Kiekerk at the following points. State both the magnitude and direction for the displacement and velocity of Wayde Van Kiekerk.

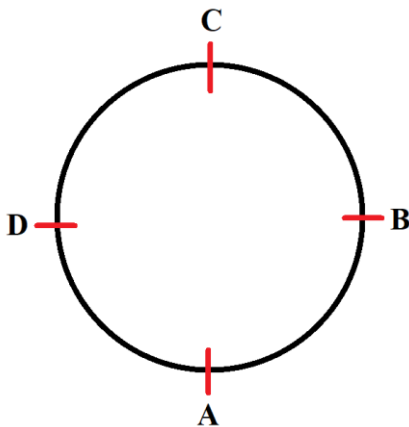|	Point B	Point C	Point D	Point A
Total Distance				
Total Displacement				
Average Speed				
Average Velocity				

3. E: Wayde Van Niekerk from Russia runs 400. meters at a constant speed around an Olympic track in a time of 43.03 s beginning at point A in a counterclockwise direction as shown below. Each semicircle has an outer perimeter of 100. meters.

Complete the following table by determining the distance, displacement, speed, and velocity of Wayde Van Kiekerk at the following points. State both the magnitude and direction for the displacement and velocity of Wayde Van Kiekerk.

	Point B	Point C	Point D	Point A
Total Distance				
Total Displacement				
Average Speed				
Average Velocity				

4. E: Wayde Van Niekerk from Russia runs 400. meters at a constant speed around a circular track in a time of 43.03 s beginning at point A in a counterclockwise direction as shown below.

Complete the following table by determining the distance, displacement, speed, and velocity of Wayde Van Kiekerk at the following points. State both the magnitude and direction for the displacement and velocity of Wayde Van Kiekerk.

	Point B	Point C	Point D	Point A
Total Distance				
Total Displacement				
Average Speed				
Average Velocity				

Take a break and play this video game:
https://universeandmore.com/motion-mapper/