Name _____

1: _____/10 + _____ late

2: _____/8 + _____ late

Incorrect/incomplete: –_____

Scaled score: _____/20

Unit 2 Learning Goals – Two-Dimensional Motion

Goal Set 1:

Students will be able to analyze two-dimensional motion using vector addition and vector resolution.

4.0	I can use vector addition and vector resolution to solve complex problems.
3.0	**I can analyze two-dimensional motion using vector addition and vector resolution.**
2.0	I recognize, recall, and understand specific vocabulary and concepts including: • One-dimensional and two-dimensional motion • Scalars and vectors • Vector components, resultants, and diagrams I am able to… • Distinguish one-dimensional motion from two-dimensional motion by recognizing and generating examples that compare and contrast both. • Perform basic trigonometry including the Pythagorean theorem and sine, cosine, and tangent functions for right triangles. • Distinguish scalars from vectors and by recognizing and generating examples that compare and contrast both. • Create accurate vector diagrams.
1.0	With help, partial success at 2.0 content

Check yourself:

Level 2.0

1.) Generate an example of something traveling in one-dimension.

2.) Take that example from question two and explain how it would have to change its motion in order to travel in two dimensions.

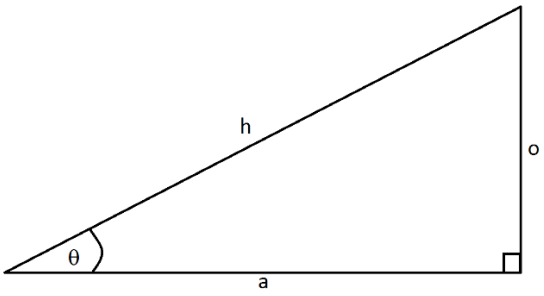
3.) A question that often comes up is the dimension of time. Is time considered as part of the definition when discussing one- or two-dimensional motion? Explain briefly.

4.) How are scalars and vectors different?

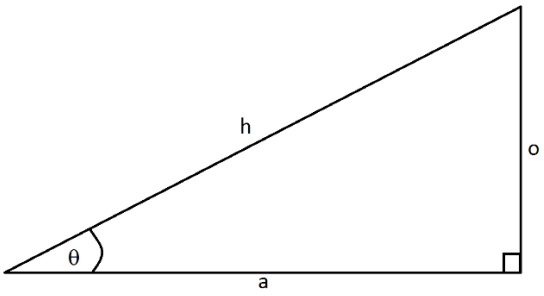
5.) Generate an example of a scalar value.

6.) Generate an example of a vector value.

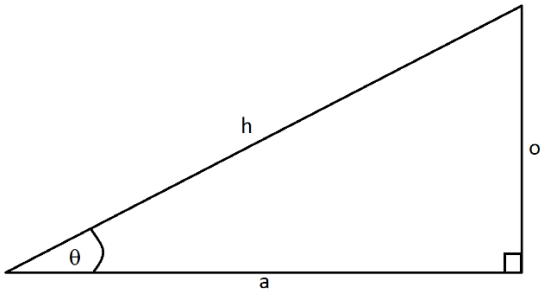
7.) For the triangles below, calculate the unknown values.



a = 7 o = 4 h = ? θ = ?



a = ? o = 12 h = 21 θ = ?



a = 85 o = ? $\theta = 32^{o}$

8.) Pac-Man moves 12 cm to the right, then 15 cm upward, then 7 cm downward (because a ghost was there), and finally 6 cm to the left.
    a. Draw the component(s) and
    b. Draw the resultant(s)

9.) Explain how vector addition and vector resolution differ.

Level 3.0

1.) Refer back to question 8. Determine the net horizontal and net vertical displacements of Pac-Man.

2.) Create a sketch to represent the net horizontal and net vertical displacements of Pac-Man.

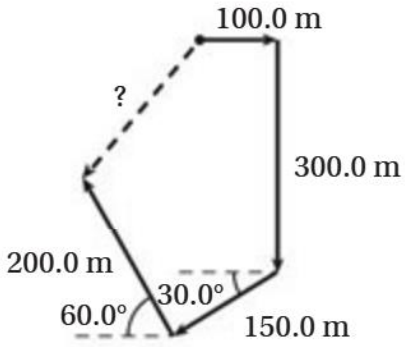
3.) On the sketch above draw the resultant.
4.) Calculate the magnitude of the resultant displacement.

5.) Calculate the direction of the resultant displacement and express it correctly in reference to up-down-left-right.

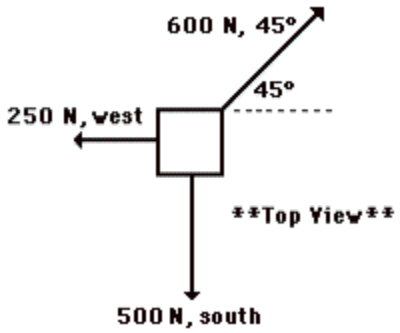
6.) A love-struck dude sees his celebrity crush across a crowded room. He tries to walk straight northward across the room to meet his true love. However, there are people walking fast to the east as he tries to cross the room, and their traffic carries him off course. Instead of landing straight across the room as intended, he arrives at an angle of 15^{o} east of north. If he walked 25 feet at this angle, how far from true love did he wind up? (Use feet as your units.)

Level 4.0

1.) A person walks the path shown below. The total trip consists of four straight-line paths. At the end of the walk, what is the person's resultant displacement measured from the starting point?



2.) The diagram below shows different forces acting on a block. The unit for force is the Newton (N). Determine the resultant force on the block.



Goal Set 2:

Students will be able to analyze the motion of a horizontally-launched projectile qualitatively and quantitatively and the motion of an upwardly-launched projectile qualitatively.

4.0	I can analyze complex problems involving projectile motion including the motion of an upwardly-launched projectile and the motion of a projectile whose launch height differs from its landing height.
3.0	**I can analyze the motion of a horizontally-launched projectile qualitatively and quantitatively and the motion of an upwardly-launched projectile qualitatively.**
2.0	I recognize, recall, and understand specific vocabulary and concepts including: • Language and concepts related to vector operations • Parabolic motion • Projectile motion I am able to… • Perform vector addition and vector resolution to analyze two-dimensional motion. • Distinguish between the horizontal and vertical components of projectile motion by comparing and contrasting the characteristics of a projectile's motion in each dimension. • Distinguish between one-dimensional free fall and projectile motion by comparing and contrasting both. • Utilize the kinematic equations to solve problems.
1.0	With help, partial success at 2.0 content

Check yourself:

Level 2.0

1.) Explain how projectile motion matches the shape of a parabola. (Hint: It has to do with whether the object ever goes completely straight down.)

2.) Compare projectile motion to free fall by stating their similarities.

3.) Contrast projectile motion from free fall by stating their differences.

4.) Describe the characteristics of the horizontal aspects of a projectile's motion.

5.) Describe the characteristics of the vertical aspects of a projectile's motion.

6.) A particular kinematics problem states an object's displacement, initial velocity, and acceleration. What formula would you use to find the object's time of travel?

Level 3.0

1.) An adventuresome pig runs along a slippery rock ledge and slides out horizontally from the ledge to dive into a lake whose water is 8.4 m below the ledge. The pig traveled with a velocity of 3.2 m/s as it slid horizontally off of the ledge. How far horizontally from the ledge did it land?

2.) A ping pong ball rolls off of a 0.86m high table, landing 0.73 m from the edge of the table. How fast was the ping pong ball rolling when it left the table? Assume air resistance is negligible.

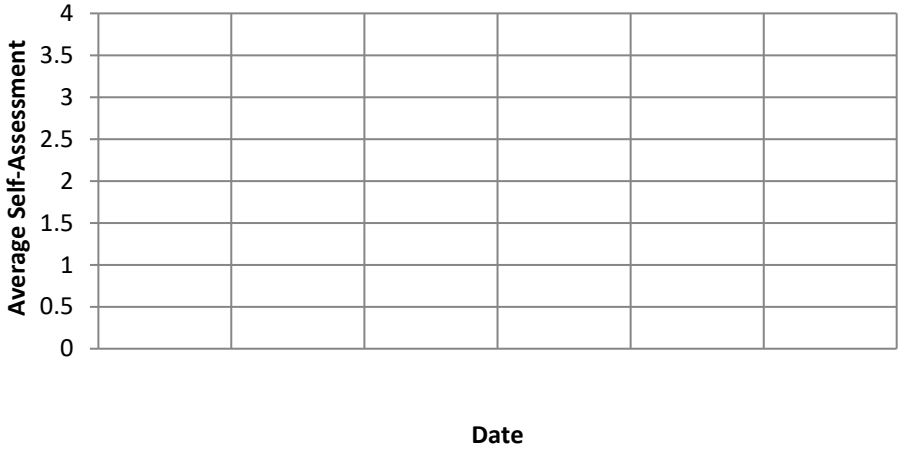
Level 4.0

Moondog launches a Cavs T-shirt with the T-shirt shooter upward toward Loudville. The shooter launches the T-shirt at an angle of 63^{o} above the horizontal, and the T-shirt leaves the shooter traveling 16 m/s.

1.) If a lucky nine-year-old catches the shirt at a height of 9.2 m above the level of the shooter, how long did it take for the kiddo to catch the T-shirt?
2.) How far does it travel horizontally during this time?

Chart your Progress

Unit 2 Learning Goals Set 1



Unit 2 Learning Goals Set 2