

Take Home Test (2D Kinematics)

Due: Tuesday



Brooklyn Tech

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This test is different than any other test you took before. I want you to draw the graph and diagram for all the problems. I want you to show math and physics or at least show enough work to convince me that you are making an effort. So once again, you will not be penalized for wrong answer but you will be penalized for missing work. Grading criteria for the Take-home test as follows:

Items	Points
Name & Period	10
Diagram/graph	40
Physics	20
Mathematics	20
Adequate explanation of problems (Limit to 2 lines)	10

1	Joseph, who is on the top of a small hill, aims his water-balloon slingshot horizontally, straight at Tim who is hanging from a tree branch a distance d away (Draw a diagram of the situation). At the instant Joseph released his water balloon. Tim is a very smart Physics student. What should he do to avoid being hit? (Wait a second! Read it again before you draw the diagram)
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2	<p>Sam sits upright in a wagon which is moving to the right at constant speed. Sam extends his hand and throws an apple straight upward while his wagon continues to travel forward at constant speed (Draw a diagram of the situation). Will the apple land (a) behind the wagon; (b) in the wagon on the Sam's hand; © in front of the wagon. (Wait a second! Read it again before you draw the diagram)</p>
3	<p>Tyler likes to punt his football a lot. Yesterday he punts and the football left his foot at a height of 1 meter above the ground. How far did the football travel before hitting the ground? (Wait a second! Read it again before you draw the diagram)</p>

4

A plane whose airspeed is 200 km/h heads due north. But a 100 KPH northeast wind (that is, coming from the northeast) suddenly begins to blow. What is the resulting velocity of the plane with respect to the ground? **(Wait a second! Read it again before you draw the diagram)**

5	<p>Mr. Bari throws a ball upward into the air with an initial velocity of 15 m/s. Calculate: (a) How high it goes; (b) How long the ball in the air before it comes back to the hand; © How long it takes for ball to reach max height? (d) Velocity of the ball when it returns to Mr. Bari's hand (e) at what time t the ball passes a point 8 meter above Mr. Bari's hand? (Wait a second! Read it again before you draw the diagram)</p>
6	<p>A football is kicked at an angle $\theta = 37^{\circ}$. With a velocity of 20 m /s. Calculate followings (Assume ball leaves at ground level). 2a. The max height (2b) Time travel before football hit the ground; (2c) How far away it hit the ground; (2d) velocity vector at max height; (e) acceleration vector at max height . Be sure to draw the diagram for the projectile with velocity components. (Wait a second! Read it again before you draw the diagram)</p>

7

Jack is trying to cross a river that flows due west with a strong current. Jack starts on the south bank and trying to reach the north bank directly North from his starting point. (1a) Draw a diagram and show the velocity vectors; (1b) describe which direction should he move? (**Wait a second! Read it again before you draw the diagram**)

8

A Boat speed in still water is $V_{bw} = 1.85$ m/s. If the boat is travel directly across the river whose current has speed $V_{ws} = 1.20$ m/s, at what upstream angle must the boat head? (**Wait a second! Read it again before you draw the diagram**)

9	<p>A space shuttle accelerates uniformly toward Jupiter from 50 m/s at $t=0$ to 150 m/s at $t=10$s. How far did it move between $t = 2$ second and $t = 6$ second. (Wait a second! Read it again before you draw the diagram)</p>
10	<p>The train station in New York and Boston are 220 miles apart. A Train left New York for Boston at 8:00 am traveling at 65 MPH. An hour later, an express train left Boston for New York traveling at 90 MPH. Draw a diagram of the situation. At what time did they pass each other? (Wait a second! Read it again before you draw the diagram)</p>

11	<p>The rain Station in New York and DC 295 miles apart. One train leave NY for DC at 9 am at average 70 MPH. A second train leaves DC for NY 2 hours later and travels at 85 MPH. Draw a diagram of the situation. At what time did they pass each other? (Wait a second! Read it again before you draw the diagram)</p>
12	<p>Tim is now at 10 KM east and 5 KM north of the point of origin. Find the resultant displacement as well as the degree of the angle. (Wait a second! Read it again before you draw the diagram)</p>

13	<p>Arnold Schwarzenegger drives on a motorcycles speeds horizontally off a 50 m high cliff (Draw a diagram of the situation). How fast must he leaves the cliff top if he is to land on level ground below, 90 meter from the base of the cliff where cameras are.</p> <p>(Wait a second! Read it again before you draw the diagram)</p>

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