

Study Guide: Motion & Forces

Motion

1. Define (*include the formula and circle diagram for calculating speed, velocity, and acceleration*):
 - a. Distance:
 - b. Speed:
 - c. Velocity:
 - d. Acceleration:
2. What is the speed of an object at rest?
3. The difference between speed and velocity is that velocity includes.
4. The SI unit for distance is
5. The SI unit for speed or velocity is
6. The SI unit for acceleration is
7. On a **distance-time** graph, what does the slope tell you?
8. On a **speed-time** graph, what does the slope tell you?

Forces

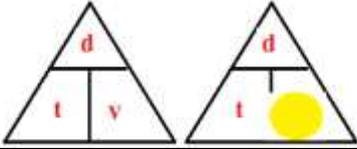
9. **Describe** (what does it say and what is it commonly called)
 - a. Newton’s First law of Motion:
 - b. Newton’s Second law of Motion:
 - c. Newton’s Third law of Motion:
10. Give **an example for each** of Newton’s laws
 - a. Newton’s First law of Motion:
 - b. Newton’s Second law of Motion
 - c. Newton’s Third law of Motion:
11. **Define and give an example of each of the following terms.**

Definition	Example
a. Friction	a. Friction:
b. Static Friction:	b. Static Friction:
c. Sliding Friction:	c. Sliding Friction:
d. Rolling Friction:	d. Rolling Friction:
e. Fluid Friction:	e. Fluid Friction:
f. Net force	f. Net force:

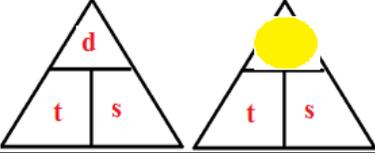
12. Can an object accelerate if there are no net forces?
13. Can an object be moving with no net force?
14. If forces are unbalanced, is there acceleration?
15. The combination of all of the forces acting on an object is called the _____
16. If the net force acting on a stationary object is zero, then the object will _____
17. A car on cruise control is an example of (balanced/unbalanced) forces.
18. When the mass of one of two objects increases, the force of gravity between the two objects
19. The law that states that every object maintains constant velocity unless acted on by an unbalanced force is
20. The law that states that for every action force there is an equal and opposite reaction force is
21. The law that states that the unbalanced force acting on an object equals the object’s mass times its acceleration is
22. What is the SI unit for force?
23. When the force of air resistance balances the force of gravity of an object that is falling, velocity (increases, stays the same, decreases)? Why?

Mixed Review Calculations [show your GIVEN, EQUATION, and SOLVE]

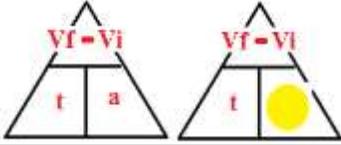
24. What is the velocity of a missile that travels north 8000 meters in 10.12 seconds?

	<p>Equation</p> 	
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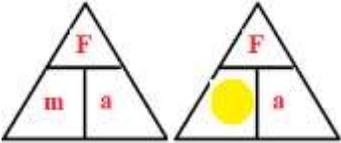
25. What distance does a rocket flying for 5 seconds at 100 m/s travel?

	<p>Equation</p> 	
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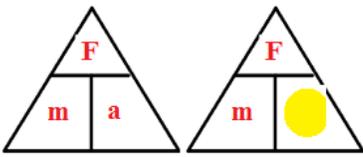
26. In 5 seconds, a car goes from 0 m/s to 60 m/s. What is the acceleration of the car?

<p>Given</p>	<p>Equation</p> 	<p>Solve</p>
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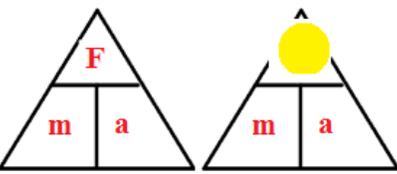
27. A car's engine produces a force of 1500 N and it accelerates at 2.5 m/s². What is its mass?

<p>Given</p>	<p>Equation</p> 	<p>Solve</p>
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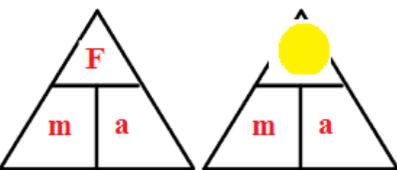
28. You throw a 0.5 kg ball with a force of 15 N. What is the ball's acceleration?

<p>Given</p>	<p>Equation</p> 	<p>Solve</p>
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29. A 15 kg ball accelerates at 20 m/s² what force was exerted on the ball?

<p>Given</p>	<p>Equation</p> 	<p>Solve</p>
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30. How much force is required to accelerate a 2 kg rock at 3 m/s²?

<p>Given</p>	<p>Equation</p> 	<p>Solve</p>
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31. A horse ran 500 meters down the hill in 50 seconds. What is the velocity of the horse?

Given	Equation	Solve

32. Sally drove at a speed of 50 km/hr. south for 2 hours. How far did she travel?

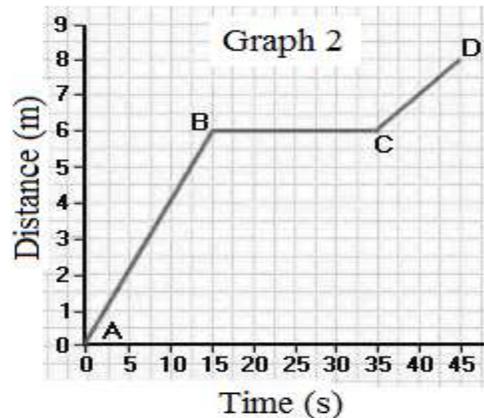
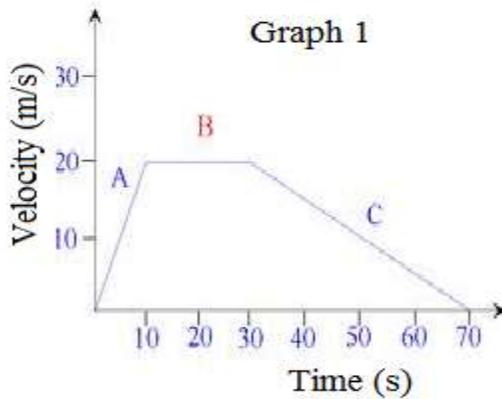
Given	Equation	Solve

33. A hiker walked a 5 kilometer trail in 65 minutes. What was his speed?

Given	Equation	Solve

Graphing Motion

34. A horizontal line on a distance-time graph means the object is
35. An upward slope on a distance-time graph means the object is
36. A downward slope on a distance-time graph means the object is
37. A horizontal line on a speed-time graph shows that an object is
38. On a speed-time graph, a line with a negative slope indicates that the object is
39. On a speed-time graph, a line with a positive slope indicates that the object is



40. On Graph 1 calculate the following (**SHOW YOUR WORK with UNITS**)
 - a. Acceleration from 0 to 10 seconds
 - b. Acceleration from 10 to 30 seconds
 - c. Acceleration from 30 to 70 seconds
41. On Graph 2 calculate the following (**SHOW YOUR WORK with UNITS**)
 - a. Find the average speed.
 - b. Find the speed from 0 to 15 seconds
 - c. Find the speed from 15 to 35 seconds