Name: _____

Period: _____

Linear Motion In Class Test Review

8

1) Circle the bigger one:
   A. Centimeters or megameters?
   B. Micrometers or millimeters?
   C. Kilometers or megameters?
   D. Centimeters or millimeters?

2) Convert 18 m/s to meters per min.

$\frac{18\text{ m}}{1\text{ s}} \mid \frac{60\text{ s}}{1\text{ min}} = 1080\ \frac{\text{m}}{\text{min}}$

3) An object moves 120 m in 15 seconds. Calculate the object's speed.

$s = ?$, $d = 120\text{m}$, $t = 15\text{s}$, $S = d/t$, $S = \frac{120\text{m}}{15\text{s}} = 8\text{m/s}$

4) An object moves 18 m/s. How long does it take the object to move 154 m?

$s = 18\text{m/s}$, $d = 154\text{m}$, $t = ?$, $S = d/t$, $t = d/s$, $t = \frac{154\text{m}}{18\text{m/s}} = 8.6\text{sec}$

5) Speed or velocity:
   A person walks 0.5 m/s to the east.
   Vector

6) Scalar or vector:
   A car is moving 30 m/s.
   Scalar (no direction)

Object A

Object B

Object C

Object D

7) The tape timers at the left show 4 objects moving to the right. The dots show the positions of the objects each second. Which objects apply to the following?

C, D Constant speed.	B Distance increases
B Positive acceleration.	B Starts at rest.
C At constant velocity.	A Is stopping.
A, B, D Accelerating.	A, B, C Constant direction.
A Decelerating.	A Negative acceleration.
C Acceleration = 0.	C $V_i = V_f$

8) A car begins at a stop sign. It ends up going 100 m in 6.5 seconds. Find the car's acceleration.

Variables: $a = ?$, $\Delta x = 100\text{m}$, $V_i = 0\text{m/s}$, $V_f = 6.5\text{sec}$, $t = \emptyset$

Equation and solve: $\Delta x = (V_i t) + (\frac{1}{2} a t^2)$

$100\text{m} = (0\text{m/s} \cdot 6.5\text{sec}) + (\frac{1}{2} a (6.5)^2)$

$a = 4.7\text{m/s}^2$

9) +, –, or 0?
   A. – Acceleration of an object that is moving to the left and speeding up?
   B. – Acceleration of an object that is moving up and slowing down?
   C. + Velocity of an object that is moving to the right?
   D. 0 Displacement of an object that ends at its starting position?
   E. – Acceleration of an thrown object at the top of its path?
   F. – Displacement of an object moving to the left?

10) What is the acceleration of a full bottle of water dropped from a desk? -9.8m/s^2 An empty bottle? 9

11) When an object is dropped or thrown into the air, what is its acceleration? 9

12) An object dropped from a 4 m tall roof. $\Delta y = -4\text{m}$ and $v_i = 0\text{m/s}$

13) An object is thrown 10 m/s into the air. How high does it go? $v_i = 0\text{m/s}$; $a = -10\text{m/s}^2$; and $v_f = 0$. use lazy # height = 1m

14) A person throws a ball into the air at 6 m/s from the ground. When it comes back, $v_f = -6\text{m/s}$, $a = -10\text{m/s}^2$ and $\Delta y = 0\text{m}$.

15) "*Sitting on the dock of the bay, wasting time*" with my sister. I get bored and push her off the 2 m dock. How fast is she moving when she belly flops into the water? (And more importantly how badly is she going to hurt me when she catches me?)

Variables: $a = -10\text{m/s}^2$, $\Delta y = -2\text{m}$, $V_f = ?$, $V_i = 0\text{m/s}$, $t = \emptyset$

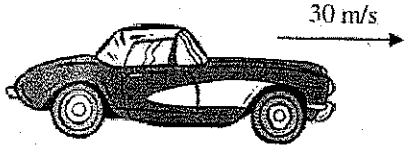
Equation: $V_f^2 = V_i^2 + 2a\Delta y$

Solve: $V_f^2 = (0\text{m/s})^2 + 2 \cdot -10\text{m/s}^2 \cdot -2\text{m}$

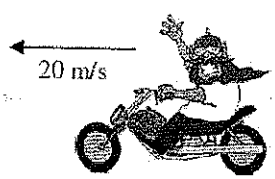
$V_f = -6.3\text{m/s}$

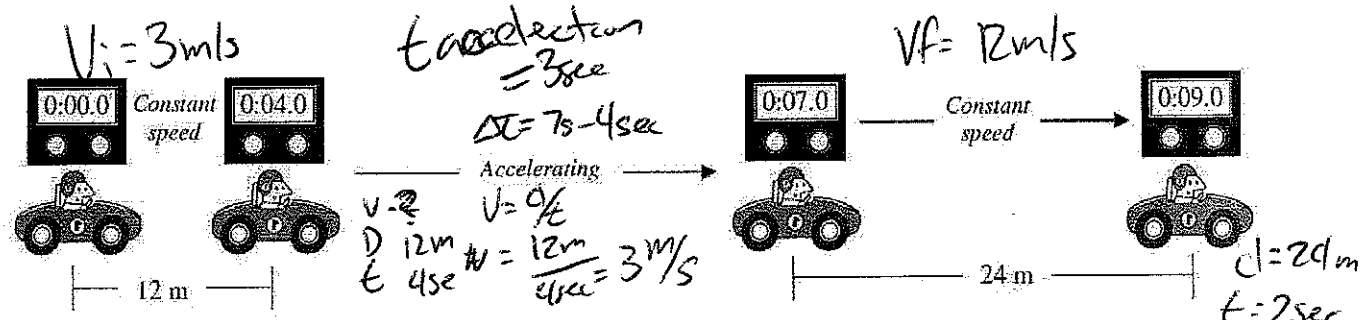
16) What is the velocity of the stop sign in the car's frame of reference? 0m/s

17) What is the motorcyclist's velocity relative to the car? 10m/s



10m/s





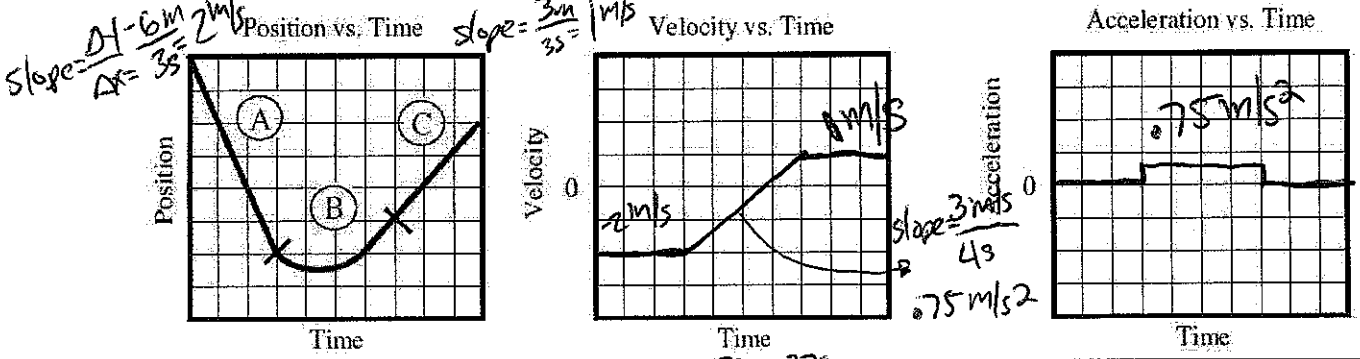
18) In the graphic above, the car is at constant speed between the first two positions and between the last two positions. Between the middle two positions it is accelerating. Calculate its acceleration.

$a = \frac{V_f - V_i}{t} = \frac{12\,m/s - 3\,m/s}{3\,sec} = \frac{9\,m/s}{3\,sec}$ 3 m/s²

Use the three motion graphs below to answer the following questions.

19) What does the slope of the graphs below tell us: Graph 1: Velocity; Graph 2: acceleration; Graph 3: nothing

20) Transfer the following graphs. Each vertical square is 1 m; each horizontal square is 1 sec.



21) Use the graph at the right to answer the following.

A. Give the linear equation for the graph at the right.

$y = mx + b$

$p = -5t + 220m$

B. Where is the object on the graph at 4.2 seconds?

$p = -5m/s \cdot 4.2s + 220m$

199 m

C. What does the y-intercept tell us about this object?

The object starts at 220 m

D. What is the speed of the graph?

-5 m/s

E. Transfer the position graph to the velocity and acceleration graphs below.