Test 1
Motion

Name_____

Part 1 Multiple Choice

(2) A baseball pitcher throws a fastball at 42 meters per second. If the batter is 18 meters from the pitcher, approximately how much time does it take for the ball to reach the batter?

(1) 1.9 s (3) 0.86 s
(2) 2.3 s (4) 0.43 s

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(2) How far will light travel in a time of 9×10^{-9} seconds

1) about 1 cm 2) about ~~3~~ 2.7 cm 3) about ~~30~~ 100 cm 4) about ~~100~~ 270 cm

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(3) A snail crawls at a velocity of 0.00167 m/sec. How many centimeters will the Snail crawl in 10 minutes. (Note 10 minutes = 600 seconds)

1) 1 cm 2) 10 cm 3) 100 cm 4) 1000 cm

---

(4) About how long will it take sound to travel 50 meters

1) about ~~0.167~~ sec .15 sec
2) about 0.334 seconds .3 sec
3) about ~~1.67~~ seconds 1.5 sec
4) about ~~3.334~~ seconds 3 sec
5) about 6 seconds 6 sec

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(5) A Car takes a 3 hour trip. During the 1st hour the car travels 60 Km. during the last two hours the car travels another 60 Km. What is the cars average velocity over the entire trip ? *(In Km/hr)*

1) 30 km/hr
2) 40 km/hr
3) 45 km/hr
4) 60 km/hr

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(6) Which of the following is true for an object with zero acceleration -

1) The object must be at rest
2) The object may be in motion
3) The object is speeding up
4) The object is slowing down

7+8

(7) A car slows from 25 m/s to 10 m/sec in 5 seconds. The cars acceleration is -

1) 15 m/s^2 2) 10 m/s^2 3) 5 m/s^2 4) 3 m/s^2

(8) The distance this car travels is -

1) 125 meters 2) 100 meters 3) 75 meters 4) 50 meters

90 m

---

9) A cart moving across a level surface accelerates uniformly at 1.0 meter per second^2 for 2.0 seconds. What additional information is required to determine the distance traveled by the cart during this 2.0-second interval?

(1) coefficient of friction between the cart and the surface
(2) mass of the cart
(3) net force acting on the cart 4 initial velocity of the cart
(4) initial velocity of the cart

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(10) A boat initially traveling at 10. meters per second accelerates uniformly at the rate of 5.0 meters per second^2 for 10. seconds. How far does the boat travel during this time?

(1) 50. m (3) 350 m
(2) 250 m (4) 500 m

---

(11) An airplane originally at rest on a runway accelerates uniformly at 6.0 meters per second^2 for 12 seconds. During this 12-second interval, the airplane travels a distance of approximately

(1) 72 m (3) 430 m
(2) 220 m (4) 860 m

12 A car initially traveling at a speed of 16 meters per second accelerates uniformly to a speed of 20. meters per second over a distance of 36 meters. What is the magnitude of the car's acceleration?

(1) 0.11 m/s^2
(2) 2.0 m/s^2
(3) 0.22 m/s^2
(4) 9.0 m/s^2

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13 A 10.-kilogram object, starting from rest, slides down a frictionless incline with a constant acceleration of 2.0 m/sec^2 for four seconds.

During the 4.0 seconds, the object moves a total distance of

(1) 32 m
(2) 16 m
(3) 8.0 m
(4) 4.0 m

---

14 A skater increases her speed uniformly from 2.0 meters per second to 7.0 meters per second over a distance of 12 meters. The magnitude of her acceleration as she travels this 12 meters is

(1) 1.9 m/s^2
(2) 2.2 m/s^2
(3) 2.4 m/s^2
(4) 3.8 m/s^2

---

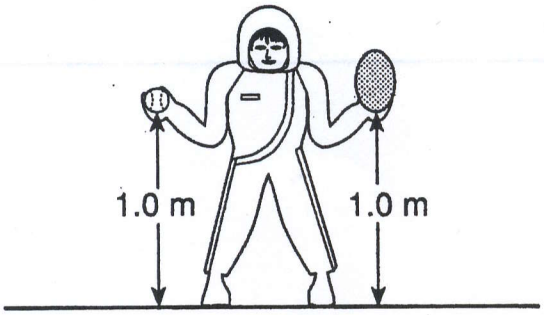
15 As an object falls freely near the surface of the Earth, its velocity

(1) decreases
(2) increases
(3) remains the same

16 As a body falls freely near the surface of the Earth, its acceleration

(1) decreases
(2) increases
(3) remains the same

17 As shown in the diagram below, an astronaut on the Moon is holding a baseball and a balloon. The astronaut releases both objects at the same time.



What does the astronaut observe?
[Note: The Moon has no atmosphere.]

(1) The baseball falls slower than the balloon.
(2) The baseball falls faster than the balloon.
(3) The baseball and balloon fall at the same rate.
(4) The baseball and balloon remain suspended and do not fall.

18 If the mass of an object were doubled, its acceleration due to gravity would be

(1) halved
(2) doubled
(3) unchanged
(4) quadrupled

19 An object is dropped from rest and falls freely 20. meters to Earth. When is the speed of the object 9.8 meters per second?

(1) during the entire first second of its fall
(2) at the end of its first second of fall
(3) during its entire time of fall
(4) after it has fallen 9.8 meters

---

20 A rock dropped off a bridge takes 5 seconds to hit the water. Approximately what was the rock's velocity just before impact?

(1) 5 m/s
(2) 2 m/s
(3) 50 m/s
(4) 125 m/s

---

21 How far will a brick starting from rest fall freely in 3.0 seconds?

(1) 15 m
(2) 29 m
(3) 44 m
(4) 88 m

---

22 A 1.0-kilogram ball is dropped from the roof of a building 40. meters tall. What is the approximate time of fall? [Neglect air resistance.]

(1) 2.9 s
(2) 2.0 s
(3) 4.1 s
(4) 8.2 s

---

23 A rock falls from rest off a high cliff. How far has the rock fallen when its speed is 39.2 meters per second? [Neglect friction.]

(1) 19.6 m
(2) 44.1 m
(3) 78.3 m
(4) 123 m

4 & 25

24) Compared to an object that falls for 1 second, an object that falls for 2 seconds has -

1) Fallen $\frac{1}{2}$ as far distance
2) Fallen the same distance
3) Fallen twice the distance
4) Fallen Four times the distance

25) Compared to an object that falls for 1 second, an object that falls for 2 seconds has -

1) Has $\frac{1}{2}$ the velocity
2) Has the same velocity
3) Has 2 times the velocity
4) Has 4 times the velocity

---

26)

A softball is thrown straight up, reaching a maximum height of 20 meters. Neglecting air resistance, what is the ball's approximate vertical speed when it hits the ground?

(1) 10 m/sec
(2) 20 m/sec
(3) 15 m/sec
(4) 40 m/sec

---

27)

What is false about a dropped object after it falls for 1 second ?

1) It has fallen about 5 meters of distance.
2) It has fallen about 10 meters of distance.
3) Its velocity is about 5 meters/sec
4) Its velocity is about 10 meters/sec
5) It has an acceleration of about 10 meters/sec^2

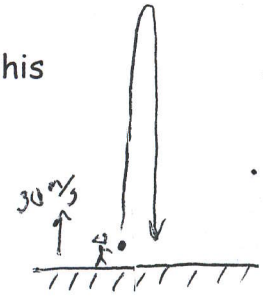
Alternate
24 to 27

Name _____

24
&25

(24) An object is thrown upwards with a velocity of 30 m/s. How high does this object rise ?

1) 10 meters 2) 15 meters 3) 30 meters 4) 45 meters



(25) For the object in the previous question, At 4 seconds after the object left the throwers hand the object is -

1) On the rising part of its trip
2) At the peak of its path
3) On the falling part of its trip
4) Back on the ground

---

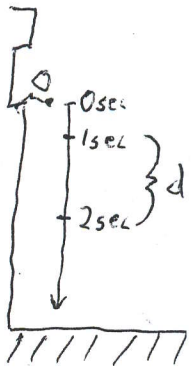
(26) An object is thrown upwards and rises to a height of 20 meters. In order to get the object to rise to a height of 80 meters the thrower woul have to throw it upwards

1) $\frac{1}{2}$ as fast 2) The same velocity 3) 2 times as fast 4) 4 times as fast

---

(27) An object is dropped off the edge of a building, The distance it falls from 1 second into its Trip to 2 seconds into its trip is -

1) 5 meters
2) 10 meters
3) 15 meters
4) 20 meters

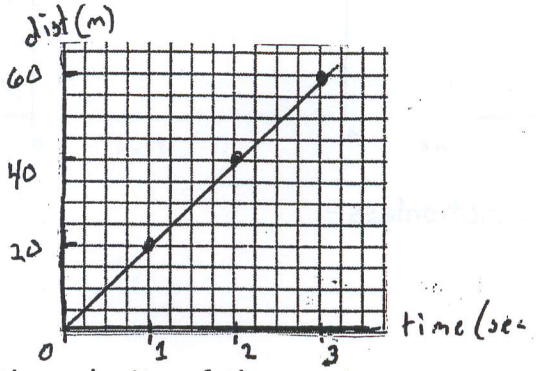


Test 1
Day 2

Name _____

28 & 24

The following graph represents distance vs time for a car traveling down the road -



(28) At 2 seconds the velocity of the car is -

1) 0 m/s 2) 20 m/s 3) 40 m/s 4) increasing

(24) At two seconds the acceleration of the car is -

1) 0 m/s^2 2) 20 m/s^2 3) 40 m/s^2 4) increasing

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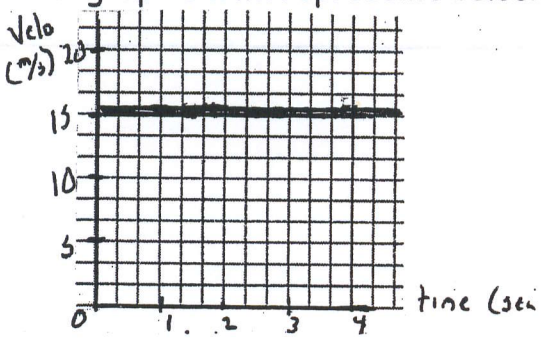
(30)

The graph shown represents velocity vs time for a kid on a skateboard.



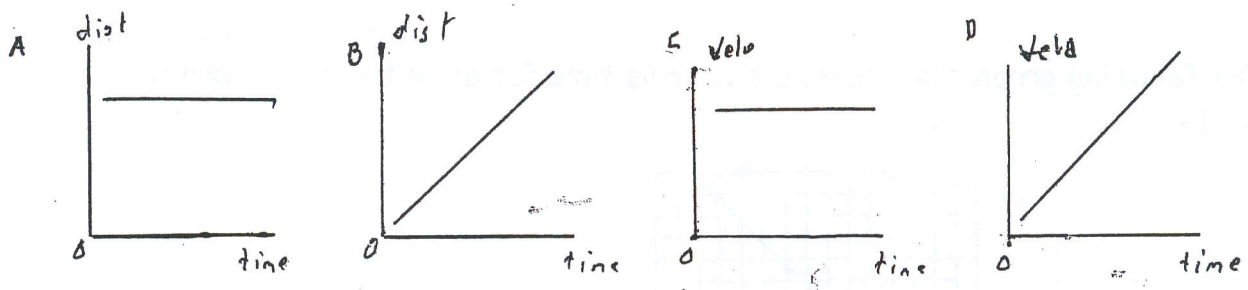
The graph indicates the kid is -

1) Motionless 2) Traveling steady speed 3) Speeding up 4) Slowing down

33

Four possible graphs for an object are shown below -

(Note A & B dist vs time, C & D velo vs. time)



31 Which graph indicates the object is motionless -

1) A 2) B 3) C 4) D

32 Which graph indicates the object is accelerating -

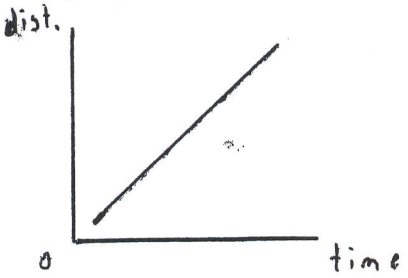
1) A 2) B 3) C 4) D

33 Which two graphs indicate the object is moving steady speed -

1) A & B 2) B & C 3) C & D 4) A & D

---

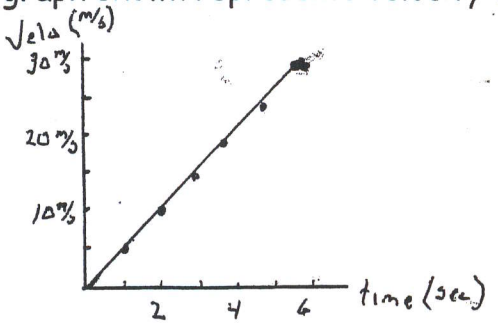
34 The graph shown indicates the object is -



1) Motionless
2) Moving but not accelerating
3) Speeding up
4) Slowing down

35 & 36

The graph shown represents velocity vs time for a car -



35 The acceleration of the car is -

1) 0 m/s^2 2) 2.5 m/s^2 3) 5 m/s^2 4) 10 m/s^2

36 The distance traveled by the car from 3 to 6 seconds is

1) 5 meters 2) 15 meters 3) 67 meters 4) 90 meters 5) 180 meters

Part 2 Problems Name_____

#1

Base your answers to questions 71 and 72 on the information below.

A 747 jet, traveling at a velocity of 70. meters per second north, touches down on a runway. The jet slows to rest at the rate of 2.0 meters per second^2.

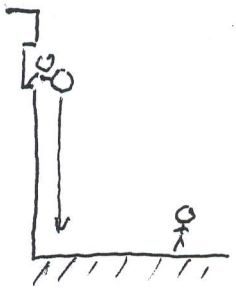
a) 71 Calculate the total distance the jet travels on the runway as it is brought to rest. [Show all work, including the equation and substitution with units.] [2]

b) Find the time it takes the jet to stop (1)

$t =$ _____ sec

#2

An student does a lab to measure the acceleration of gravity. To do so She drops a beach ball out a widow 6 meters from the ground. Her lab partner measures the balls time in the air to be 1.2 seconds.



A - What is the balls initial velocity (1)

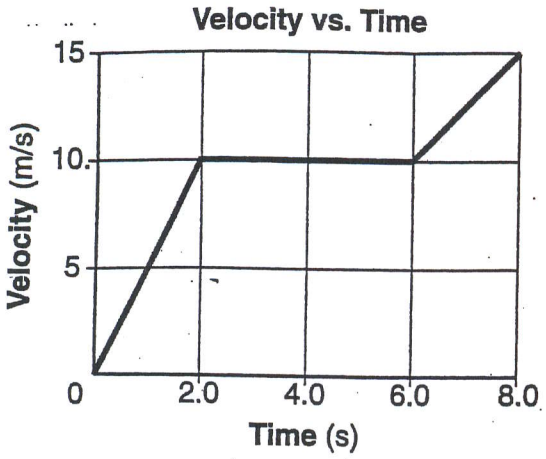
$V_i =$ _____ m/s

B - Using the measured time of 1.2 seconds Find the experimental value for the accel. of gravity. *(Show equ. With sub. & units)* (2)

C - Suggest a reason why the experimentally calculated acceleration is different from the accepted value of 9.81 m/s (1)

#3

The graph below represents the velocity of an object traveling in a straight line as a function of time.

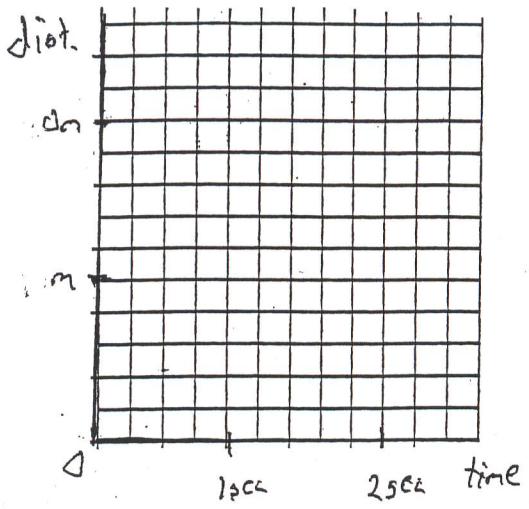


a) Find the objects acceleration in the 1st 2 seconds of travel
(Show equ. With sub & units)

b) Determine the magnitude of the total displacement of the object at the end of the first 6.0 seconds. [1]

d = _____ meters

c) Make a distance vs time graph for the objects 1st two seconds of travel (1)



#4

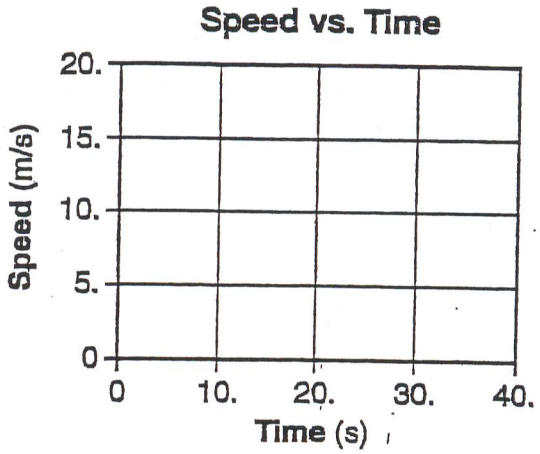
Base your answers to questions 64 through 66 on the information below.

A car on a straight road starts from rest and accelerates at 1.0 meter per second^2 for 10. seconds. Then the car continues to travel at constant speed for an additional 20. seconds.

A) 64 Determine the speed of the car at the end of the first 10. seconds. [1]

B) 65 On the grid *in your answer booklet*, use a ruler or straightedge to construct a graph of the car's speed as a function of time for the entire 30.-second interval. [2]

C) 66 Calculate the distance the car travels in the first 10. seconds. [Show all work, including the equation and substitution with units.] [2]



Do 65 or B on graph

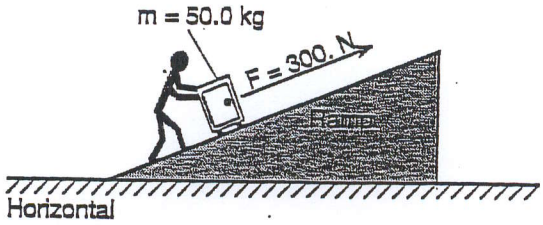
64 or A

v = _____ m/s

66 or C

5)

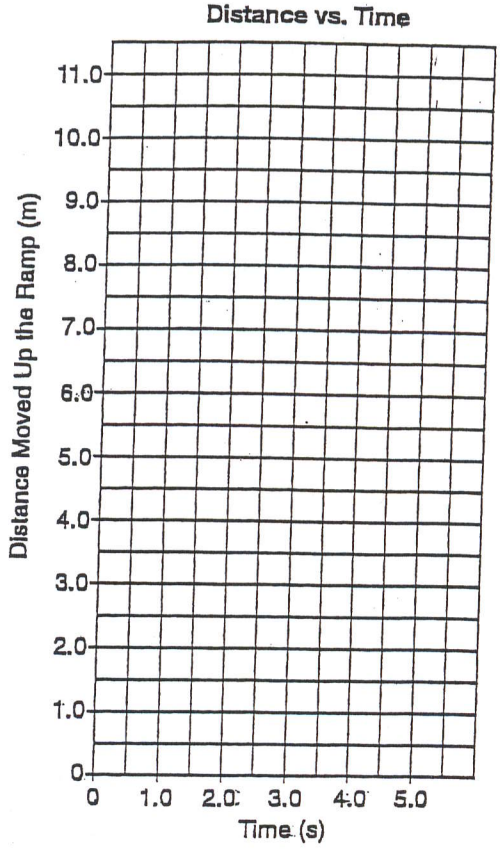
Base your answers to questions 116 through 118 on the diagram and data table below. The diagram shows a worker moving a 50.0-kilogram safe up a ramp by applying a constant force of 300. newtons parallel to the ramp. The data table shows the position of the safe as a function of time.



Time (s)	Distance Moved up the Ramp (m)
0.0	0.0
1.0	2.2
2.0	4.6
3.0	6.6
4.0	8.6
5.0	11.0

A) 116 Using the information in the data table, construct a line graph on the grid provided *on your answer paper*. Plot the data points *and* draw the best-fit line. [2]

The grid on the next page is provided for practice purposes only. Be sure your final answer appears *on your answer paper*.



B) 117 Using one or more complete sentences, explain the physical significance of the slope of the graph. [1]

Long problem Answers

2) a - $V_i = 70\ m/s$, $V_F = 0\ m/s$, $d = ?$, $a = -2\ m/s^2$

$V_F^2 = V_i^2 + 2ad$

$(0\ m/s)^2 = (70\ m/s)^2 + 2(-2\ m/s^2)d$

$0 = 4900 - 20d$

$d = 1225\ meter$

$V_F = V_i + at$

$0\ m/s = 70\ m/s + (-2\ m/s^2)t$

$t = 35\ sec$

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2)

$V_i = 0\ m/s$

$d = 6m$, $V_i = 0\ m/s$, $a = ?$, $t = 1.2\ sec$

$d = V_i t + \frac{1}{2} a t^2$

$6m = 0\ m/s\ t + \frac{1}{2} a (1.2\ sec)^2$

$a = 8.3\ m/s^2$

c - Air resist

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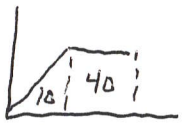
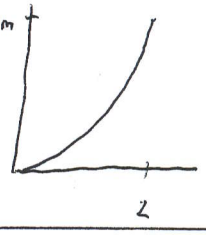
3) a - accel = slope = $\frac{\Delta V}{t}$

$= \frac{10\ m/s - 0\ m/s}{2s - 0s} = 5\ m/s^2$

b - Area = 50m



c -



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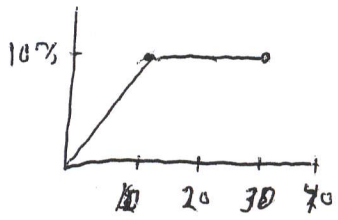
4) a - $a = \frac{\Delta V}{t}$

$1\ m/s^2 = \frac{\Delta V}{10\ sec}$

$\Delta V = 10\ m/s$

b -



c - Area = $\frac{1}{2} bh = \frac{1}{2}(V_i + V_F)t$

$= \frac{1}{2}(10s)(10\ m/s) = 50m$

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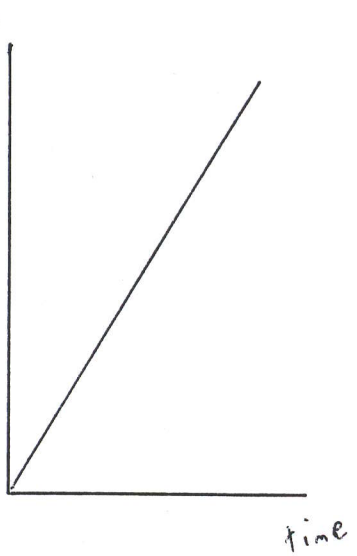
5)



Slope is Velocity

Multiple choice

1 -4
2 -4
3 -3
4 -1
5 -2
6 -2
7 -4
8 -2
9 -4
10 -3
11 -3
12 -2
13 -2
14 -1
15 -2
16 -3
17 -3
18 -3
19 -2
20 -3
21 -3
22 -1
23 -3
24 -4
25 -3
26 -2
27 -2 or -3
28 -2
29 -1
30 -2
31 -1
32 -4
33 -2
34 -2
35 -3
36 -3