

Quiz Review

Name: _____

Period: _____

- 1) Work is the product of Force times Distance.
- 2) Power is Work divided by time.

Questions 3-4

A 85kg man lifts a 5kg box to the height of 6m in 10sec.

- 3) ~~How much~~ work was done on the box?
 a. 294 J b. 30 J c. 5292 J d. 510 J
- 4) What is the power?
 a. 2.6W b. 29.4W c. 156.8 d. 240W

Questions 5-6

A 50kg woman pushes a 10 kg box across a 2m floor with a 40N force, in 4.0seconds.

- 5) How much work was done on the box?
 a. 196 J b. 160 J c. 120 J d. 80 J
- 6) What is the power?
 a. 49 W b. 40 W c. 30 W d. 20 W

Questions 7-8

A 98 kg horse pulls a 80 kg sled for 100m, while giving the sled an acceleration of 2m/s^2 . It takes the horse 60 seconds.

- 7) How much work was done on the sled?
 a. 19600 J b. 16000 J c. 17800 J d. 78400 J
- 8) What is the power exerted?
 a. 326.7 W b. 266.7 W c. 296 W d. 10 W

Questions 9-10

Bob and Tom each carry a 60N box to the top of a 8m stair case. Bob does it in 45 seconds & Tom does it in 60 seconds.

- 9) Who does more work?
 a. Bob b. Tom c. Neither (Both do the same amount of work)
- 10) Who exerts more power?
 a. Bob b. Tom c. Neither (Both exert the same amount of power)

Questions 9-14

Lauren carries a 50N box across a 20m room and hands the box to Jessica; Jessica then lifts the box 1.5 meters in 3 seconds.

- 11) Who does more work?
 a. Lauren b. Jessica c. Neither (Both do the same amount of work)
- 12) Who exerts more power?
 a. Lauren b. Jessica c. Neither (Both exert the same amount of power)

13) How much work does Lauren do?

a. 1000 J

b. 9800 J

c. 0 J

d. 490 J

14) How much work does Jessica do?

a. 75 J

b. 25 J

c. 0 J

d. 735 J

15) What is the GPE (Gravitational Potential Energy) of a 10 kg object suspended 30 meter in the air from a 5000 kg crane driving 2m/s?

a. 1470000 J

b. 2940 J

c. 300 J

d. 150000 J

16) What is the KE (Kinetic Energy) of a 10 kg object suspended 30 meter in the air from a 5000 kg crane driving 2m/s?

a. 10 J

b. 1200 J

c. 10000 J

d. 20 J

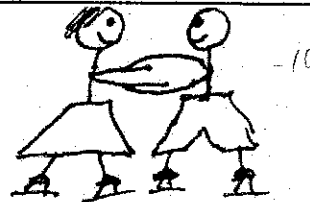
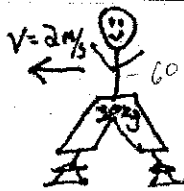
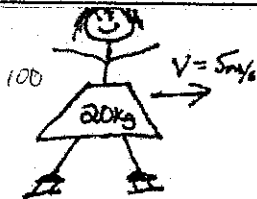
17) For collisions and explosions we can use what property of momentum?

a. Momentum is destroyed

c. Momentum is always zero

b. Momentum is conserved

d. Momentum is never zero



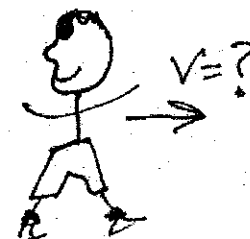
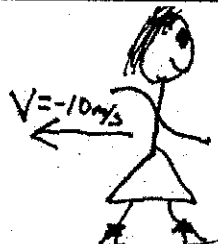
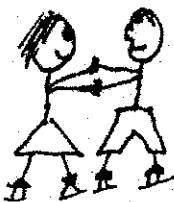
18) Two skaters experience a head on collision. The first skater has a mass of 20kg and a velocity of 5m/s [East] (before the collision). The second skater has a mass of 30kg and a velocity of 2m/s [West] (before the collision). What is their velocity after the collision if they hold on to one another?

a. 0.8 m/s

b. 2 m/s

c. 10 m/s

d. 3 m/s



19) Two ice skaters are at rest holding on to each other; they suddenly push off of one another giving skater one (mass = 40kg) a velocity of -10m/s. If the second skater has a mass of 80kg what will his/her velocity be?

a. 10 m/s

b. 20 m/s

c. 5 m/s

d. 20 m/s

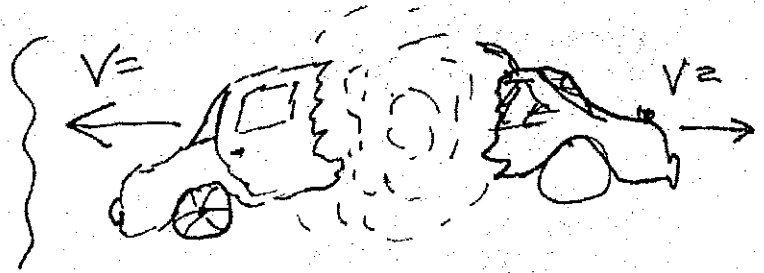
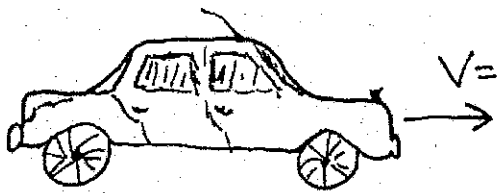
20) According to the law of conservation of momentum, in the absence of an external force the momentum of a system remains _____?

a. constantly changing

c. unchanged

b. constantly zero

d. incomprehensible



21) A 1800kg car was traveling 20m/s when it blew up! The front of the car (1200kg) ends up going 100m/s forward, how fast does the back of the car travel?

- a. -36000 m/s b. -200 m/s c. -12000 m/s **d. -140 m/s** e. -100 m/s

Given the following diagram answer the next four questions.



22) What is the momentum of Object A, before the collision?

- a. 2 Ns b. 4 Ns c. 0 Ns **d. 20 Ns**

23) What is the momentum of Object B, before the collision?

- a. 2 Ns b. 4 Ns **c. 0 Ns** d. 20 Ns

24) What is the momentum of Object A & B, after the collision?

- a. 2 Ns b. 4 Ns c. 0 Ns **d. 20 Ns**

25) What is the velocity of Object A & B, after the collision?

- a. 3.3 m/s** b. 120 m/s c. 0 m/s d. 2.5 m/s

26) According to the law of conservation of momentum, in the _____ the momentum of a system remains?

- a. absence of an external force b. presences of an external force.

27) Impulse is the product of Force and _____ *time*

28) Impulse is also equal to the change of _____ *P*

29) Momentum is the product of mass and _____ *v*

30) A force of 20N is applied to a 30kg mass for 2 seconds; what is the impulse?

- a. 600Nkg c. 60 kgs
b. 10 N/s **d. 40 Ns**

31) A 100kg car driving 20m/s crashes into a wall (the wall does not move). What is the impulse on the car?

- a. 5 Ns **c. -2,000 Ns**
b. 2,000 Ns d. 0.2 Ns

32) A 2kg soccer ball is traveling 5m/s when someone kicks the ball giving it a new velocity of 20m/s.

What was the force applied to the ball if the force acted on the ball for 0.5sec.?

- a. 40N
b. 100N
c. 10N
d. 60N

33) The statement "Momentum is always conserved" means..

- a. Momentum is neither created nor destroyed.
b. Momentum is always lost.
c. Momentum is always created.

34) For explosions we can use what property of momentum?

- a. Momentum is destroyed
b. Momentum is conserved
c. Momentum is always zero
d. Momentum is never zero

35) A 10kg cannon is fired! The cannon ball gained a 200m/s velocity; if the cannon ball has a mass of 0.5kg, what is the recoil velocity of the cannon?

- a. -10 m/s
b. -90 m/s
c. -200 m/s
d. -40 m/s
e. -400 m/s

36) A 1200kg car was traveling 40m/s when it blew up! The front of the car (1000kg) end up going 200m/s forward, how fast was the back of the car traveling?

- a. -40 m/s
b. -200 m/s
c. -48000 m/s
d. -760 m/s
e. -152000 m/s

37) Forces come in _____.

- a. Apples
b. Pairs
c. Alone
d. Grapes

38) With every force there is always a(n) _____ and _____ force.

- a. Equal, opposite
b. Equal, same
c. Different, bigger
d. Similar, smaller

39) If I push the wall with 200N of Force, the wall pushes me with _____ of force.

- a. 0 N
b. 100 N
c. 200 N
d. 400 N

40) If you push off a planet with 600 N of force, the planet experiences _____ force.

- a. Zero
b. Less
c. More
d. Same

41) If you reach terminal velocity your Net Force is _____.

- a. 9.8 N
b. 0 N
c. No such thing as Net Force
d. 5 N

42) If you reach terminal velocity your Acceleration is _____.

- a. 9.8 m/s²
b. 0 m/s²
c. No such thing as Acceleration
d. 5 m/s²

43) A dog hits a cat North with his paw. Which way does the cat hit the dog?

- a. North
b. South
c. West
d. East

44) A man jumps from a plane, after some time he is experiencing an air resistance of 200 N and the force due to gravity (weight) 600N. What is the acceleration of the man if his mass is 60kg?

- a. ~~-1 m/s²~~
 b. ~~2.33 m/s²~~

- c. ~~1 m/s²~~
 d. ~~-2.33 m/s²~~

$$\frac{R - W}{m} = A = -6.6 \text{ m/s}^2$$

45) A shoe was dropped off a roof, after some time the shoe is experiencing an air resistance of 2 N and the force due to gravity (weight) 5N. What is the acceleration of the shoe if the mass was 3kg?

- a. -1 m/s²
 b. 2.33 m/s²

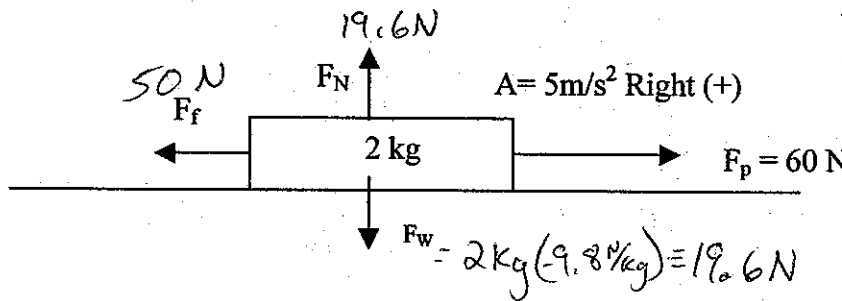
- c. 1 m/s²
 d. -2.33 m/s²

46) A man, with a weight of 800N, stands on one foot. If his foot has a surface area of 0.4m²; what is the pressure applied by his foot?

- a. 40 m/s²
 b. 0.4 m/s²

- c. 0.8 m/s²
 d. 2000 m/s²

47) Find the missing forces



$$F_{\text{net}} = 2 \text{ kg} (5 \text{ m/s}^2) = 10 \text{ N}$$

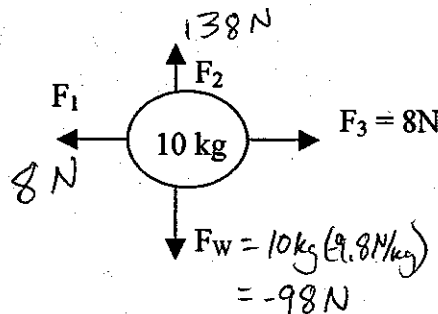
$$F_{\text{net}} = F_p + F_f$$

$$10 \text{ N} = 60 \text{ N} + F_f$$

$$F_f = -50 \text{ N}$$

48) Find the missing forces

Acceleration Up (+) 4 m/s²



$$F_{\text{net}} = 4 \text{ m/s}^2 (10 \text{ kg}) = 40 \text{ N}$$

$$F_{\text{net}} = F_2 + F_w$$

$$40 \text{ N} = F_2 + (-98 \text{ N})$$

$$F_2 = 138 \text{ N}$$

49) In Deep Space a gun is fired; how much force will be required to keep the bullet going?

- a. Tons of Force
 b. None

- c. Half the force with which it was fired.
 d. Same amount with which it was fired.

50) The Law of Inertia (Newton's 1st Law) states: an object at rest will stay at _____, an object in motion will stay in _____, unless an _____ force acts upon it.

- a. Motion, doors, inward
 b. Bay, side, outside

- c. Motion, rest, outside
 d. Rest, motion, outside

51) A ball rolls down a hallway and slows until it stops. Why would this **not** be a violation to Newton's 1st Law?

- a. Because the ball has inertia and wants to stop.
- b. Because the ball has an outside force acting on it.
- c. Because it has a natural state of rest

52) A bottle of Soda was placed on the dashboard of your car; your car was traveling 40m/s. You make a sudden stop, to let a quacking duck pass across the road. What happens to the Soda?

- a. The Soda remains on the dashboard.
- b. The Soda flies to the backseat of the car.
- c. The Soda hits the front windshield.
- d. The soda lands in your lap.

53) A child is riding on a train going a constant 60m/s, when she drops her piece of candy. According to the child where does the candy land?

- a. 0.6 meters ahead of the candy's original position.
- b. Somewhere behind the candy's original position.
- c. Some point directly beneath the candy's original position.

54) Which object has more inertia?

- a. $v = 5\text{m/s}$
- b. $v = 10\text{m/s}$
- c. $v = 1\text{m/s}$
- d. $v = 50\text{m/s}$

10kg

100kg

2kg

5kg

55) If you double the force on an object, what happens to the acceleration?

- a. It quadruples
- b. It stays the same
- c. It halves
- d. It doubles

56) What is the Net Force on an object that has a 10 kg mass and a 4m/s^2 acceleration?

- a. 2.5 N
- b. 0.4 N
- c. 0 N
- d. 40 N

57) What is the weight of a 10kg mass (on Earth)?

- a. 9.8 N
- b. 98 N
- c. 1.02 N
- d. 10 N

58) What is the mass of a 5 kg object taken to the moon (assume g on the moon is 1.6N/kg)?

- a. 15.7 N
- b. 49 kg
- c. 5 kg
- d. 15.7 kg

59) Which of the following is a vector?

- a. Velocity
- b. Mass
- c. Time
- d. Speed

60) A vector must have:

- a. Size and unit
- b. Size only
- c. Attitude
- d. Size, unit, & direction

61) Which is a scalar quantity?

- a. Speed
- b. Displacement
- c. Acceleration
- d. Velocity

62) A scalar quantity must have:

- a. Size and unit
- b. Size, unit, & direction
- c. Direction only
- d. Taste

63) If Tom ran 30m [W] and then 15m [E], which diagram would represent his displacement?



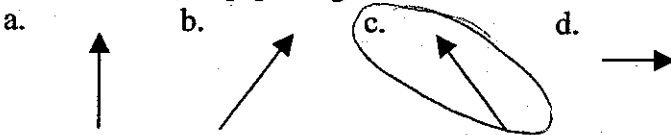
64) Marisa was driving her red convertible, going 35m/s [E], when she threw a ball at 1m/s toward her little brother in the backseat. What is the ball's velocity relative to the ground?

- a. 34 m/s [W]
- b. 36 m/s [E]
- c. 34 m/s [E]
- d. 1 m/s [W]

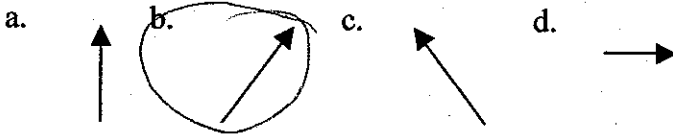
65) What is the relative velocity of the ball to Marisa's little brother?

- a. 34 m/s [W]
- b. 36 m/s [E]
- c. 34 m/s [E]
- d. 1 m/s [W]

66) 8m [N] minus 2m [E] will give a resultant of:



67) 8m [N] plus 2m [E] will give a resultant of:



68) Martha was driving the flower bus when she accidentally drove off the 4th floor of a parking garage. Luckily she was only traveling 2m/s and the fourth floor was only 9.6m high. (The lucky part was she ditched the bus.)

- a. How far was the bus, from the wall when it landed? 2.8 m
- b. What was the X velocity just before it landed $V_x = 2 \text{ m/s}$
- c. What was the Y velocity just before it landed $V_y = 13.7$
- d. What was the total velocity just before it landed? $\sqrt{2^2 + 13.7^2} = 13.8 \text{ m/s}$

X	Y
2 m/s	$V_1 = 0$
	V_2
	$0 \text{ A} - 9.8$
	$\Delta 9.6 \text{ m}$
1.4	t 1.4

69) Frankie two toes shot an artillery shell at a 40° angle. The shell had a muzzle velocity of 230m/s.

- a. What is the initial X velocity? $V_x = \cos(40) 230 = 176.2 \text{ m/s}$
- b. What is the initial Y velocity? $V_y = \sin(40) 230 = 147.8 \text{ m/s}$
- c. How far did the shell go before it hit the ground? $D_y = 1108.5 \text{ m}$
- d. What will the maximum height of the shell be? $D_x = 5286 \text{ m}$

X	Y (Top)
176.2	$V_1 = 147.8 \text{ m/s}$
	$V_2 = 0$
	$\text{A} - 9.8 \text{ m/s}^2$
	D
$30 \text{ s} = t = \frac{1}{0} (15 \text{ s})$	

70) Which of the following is a vector?

- a. Velocity
- b. Mass
- c. Time
- d. Speed

71) A vector must have:

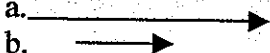
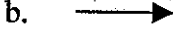
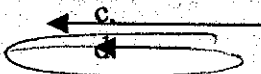
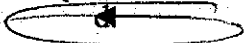
- a. Size and unit
- b. Size only
- c. Attitude
- d. Size, unit, & direction

$$D = \frac{V_1 + V_2}{2} t$$

$$D_y = \frac{147.8}{2} (15 \text{ s})$$



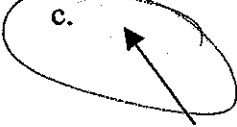

- 72) Which is a scalar quantity?
 a. Velocity
 b. Displacement
 c. Acceleration
 d. Distance



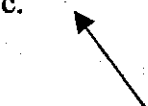

- 73) A scalar quantity must have:
 a. Size and unit
 b. Size, unit, & direction
 c. Direction only
 d. Charisma

- 74) If Tom ran 30m [W] and then 15m [E], which diagram would represent his displacement?
 a. 
 b. 
 c. 
 d. 

- 75) Todd was driving his Cadillac, going 50m/s [E], when he threw a ball at 5m/s toward his windshield. What is the ball's velocity relative to the ground?
 a. 250 m/s [W]
 b. 55 m/s [E]
 c. 45 m/s [E]
 d. 10 m/s [W]

- 76) What is the relative velocity of the ball to Bob, a passenger in Todd's car?
 a. 5 m/s [W]
 b. 55 m/s [E]
 c. 5 m/s [E]
 d. 45 m/s [E]

- 77) 10m [N] minus 5m [E] will give a resultant of:
 a. 
 b. 
 c. 
 d. 

- 78) 10m [N] plus 5m [E] will give a resultant of:
 a. 
 b. 
 c. 
 d. 

Solve the following vector problems **mathematically**.

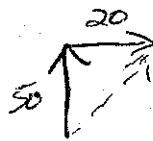
Draw a sketch and solve.

Use Pythagorean Theorem for the magnitude: $r^2 = a^2 + b^2$

Use $\sin^{-1} = \text{op/hy}$ or $\tan^{-1} = \text{op/adj}$ or $\cos^{-1} = \text{adj/hy}$ to find your angles

- 79) Tommy drives 50km [N] then goes 20km [E].

$53.8 \text{ km } [N 21.8^\circ E]$



$c = \sqrt{20^2 + 50^2} = 53.8$
 $\tan^{-1}\left(\frac{20}{50}\right) = 21.8^\circ$

Using your Kinematic Equations Solve each Problem.

- 80) A tennis ball is rolling along on the sidewalk at 10 m/s when it enters the grass, which then slows it down with a uniform acceleration until it stops, some 2.0 m into the grass. What was the tennis ball's acceleration?

Given: $V_i = 10 \text{ m/s}$
 $V_f = 0$
 $D = 2 \text{ m}$
 $A = ?$

Equation: $V_f^2 = V_i^2 + 2AD$ Answer: -25 m/s^2

81) Billy is riding his bike, he has no acceleration and is traveling 5.0 m/s. He travels 250 m, how long did it take him to travel that distance?

Given: $A = 0$
 $V_1 = 5 \text{ m/s}$
 $D = 250 \text{ m}$
 $t = ?$

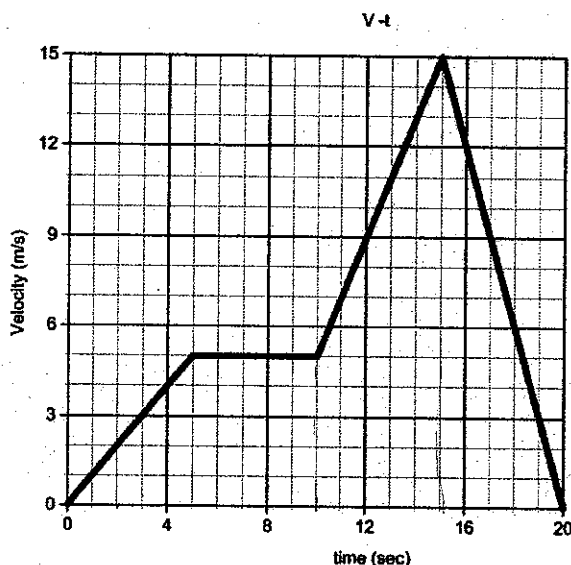
Equation: $V = \frac{D}{t}$
 $t = \frac{D}{V}$ Answer: 50 s

82) If a biker was cruising along with a speed of 80 m/s, he/she saw a red light 160m ahead and slowed to a stop. What was the biker's acceleration?

Given: $V_1 = 80 \text{ m/s}$
 $V_2 = 0$
 $D = 160 \text{ m}$
 $A = ?$

Equation: $V_2^2 = V_1^2 + 2AD$ Answer: _____
 $-(80)^2 = 2(160 \text{ m})A$

Given the Graph Below answer questions 1-12



82) What is the velocity of the object at 2 seconds? 2 m/s

83) What is the velocity of the object at 12 seconds? 9 m/s

84) What is the velocity of the object at 17 seconds? 9 m/s

85) What is acceleration during 0-5 seconds? $a = \frac{5 \text{ m/s}}{5 \text{ s}} = 1 \text{ m/s}^2$

86) What is the acceleration during 5-10 seconds? $A = 0$

87) What is the acceleration during 15-20 seconds? $A = \frac{15 \text{ m/s} - 5 \text{ m/s}}{20 \text{ s} - 15 \text{ s}} = 2 \text{ m/s}^2$

88) What is the objects displacement during time 0-5 seconds? $D = \frac{1}{2}(5 \text{ s})(5 \text{ m/s}) = 12.5 \text{ m}$

89) What is the objects displacement during time 5-10 seconds? $D = (5 \text{ m/s})(5 \text{ s}) = 25 \text{ m} = 25 \text{ m}$

90) What is the objects displacement during time 10-15 seconds? $D = (5 \text{ m/s})(5 \text{ s}) + \frac{1}{2}(5 \text{ s})(10 \text{ m/s}) = 50 \text{ m}$

91) What is the objects displacement during time 15-20 seconds? $D = \frac{1}{2}(5 \text{ s})(15 \text{ m/s}) = 37.5 \text{ m}$

92) Is the object at rest during the time interval of 5-10 seconds? No

- 93) Mechanics is the study of
- a. Heat & temperature
 - b. Electricity & Magnetism
 - c. Particle Motion
 - d. Motion & its causes

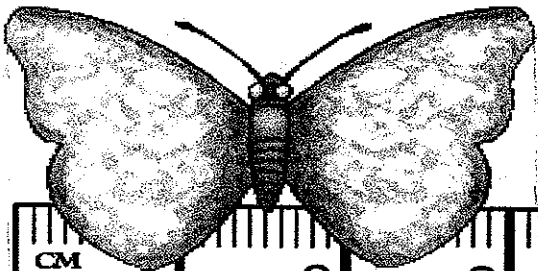
- 94) Theories can be accepted as facts and are considered Natural Laws.
- a. True Statement
 - b. False Statement

- 95) There are 1,000 _____ in a meter.
- a. Centimeters
 - b. Milligrams
 - c. Millimeters
 - d. Kilometers

- 96) There are 100 _____ in a meter.
- a. Centimeters
 - b. Decameters
 - c. Millimeters
 - d. Kilometers

- 97) There are 1,000 _____ in a kilometer.
- a. Centimeters
 - b. Grams
 - c. Millimeters
 - d. meters

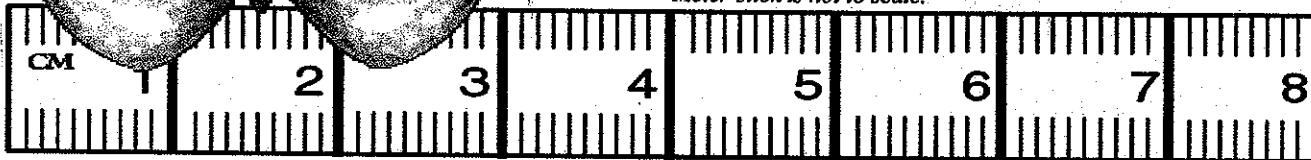
98) Given the meter-stick bellow, how wide is the butterfly from tip to tip?



Don't forget UNITS!

$\approx 3.15 \text{ cm}$

Meter-stick is not to scale.



- 99) A monkey swings to and fro 8 times in 4 seconds.
What is the Period of the monkey?

$$T = \frac{\text{time}}{\text{cycles}} = \frac{4}{8} = \frac{1}{2}$$

- a. 2 seconds
- b. 0.5 seconds
- ~~c. 2 Hertz~~
- ~~d. 0.5 hertz~~

- 100) Using the information from # 7. What is the frequency of the monkey?

- a. 2 seconds
- b. 0.5 seconds
- c. 2 Hertz
- d. 0.5 hertz

- 101) Every 6 dots on a ticker tape equals

- a. 0.01 sec
- b. (1/60) sec
- c. 1.0 sec
- d. 0.1 sec