WARNING

This guide is not the only thing you should use to study. It does not provide you with everything you need. You should also rely on your textbook, homework, and classroom notes. Use everything you can for the best results.

Topic 1: Motion – Binder entries Page 19-21, textbook pg. 6 - 8

1. **True**/False: An object is in motion if its distance from another object is changing.

2. An object you use to compare and to determine if motion is occurring is called a:
   a. Comparison object   b. Force   c. Newton   **d. Reference point**

3. Imagine you are sitting in a chair. It is both correct to say you are moving and you are not moving. Which reference point below can be used to prove that you are moving?
   a. The ground   b. The chair you're sitting in   **c. The sun**

4. Match the statements with the correct type of reference point.
   A An oak tree   A. Stationary reference point
   B Harder to identify motion with   B. Moving reference point
   B A person running
   A Not moving and easier to use

5. Imagine you are riding in a car. After looking out the window and looking throughout the car, which objects below would appear to be in motion? This is from your relative position.
   _____ The person sitting next to you
   ✓ The ground
   ✓ The sun
   _____ The interior of the car

6. Person A is standing on the platform of a train station, and person B is riding by the platform in a train. Which person appears to be in motion, and which person is actually in motion?
   Person A = __Appears to be moving__
   Person B = __Is actually moving__

Topic 2: Distance – Binder entries 22-25, textbook pg. 9

7. Why is it important for scientists to use the SI system of units? So they can communicate clearly about measurements regardless of their native language.

8. Match the following units with the type of measurement they are used for:
   B meters   A. Speed
   D minutes   B. Distance
   A km/s   C. Acceleration
   C m/s²   D. Time

9. Match the following SI units of measurement with the distance you would use them to measure:
   D The width of a blade of grass   A. Meter (m)
   A The length of your living room   B. Kilometer (Km)
   B The distance from Pennsylvania to New York C. Centimeter (cm)
   C The length of your shoe   D. Millimeter (mm)

10. A turtle with a red paint brush attached to its shell is placed on a grid. The turtle is allowed to crawl around the grid and traces out the path shown on the right. All numbers are in meters (m).
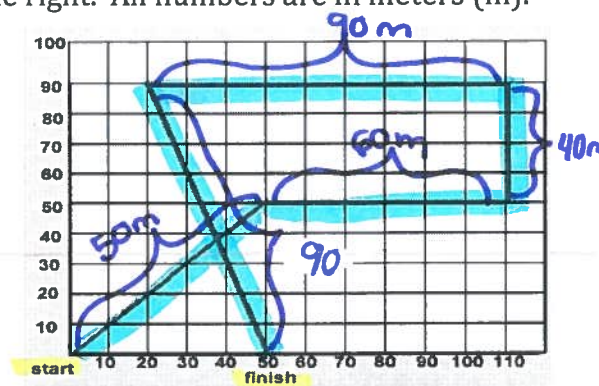
a) What is the total distance covered by the turtle?

330m

b) What is the displacement of the turtle?

↑
(Shortest distance from start to finish)

50m

11. A bear leaves his cave and walks 500 meters to a nearby river to catch fish. After the bear finishes eating, it returns to its cave.
    a) What is the total distance covered by the bear? ___1,000 m___
    b) What is the displacement of the bear? ___0m___

Topic 3: Speed – Binder entries Page 7-9, textbook pg. 26-29

12. (True)/False: In order to calculate speed, you need to know distance and time.

13. Draw the speed triangle and list the three equations it gives you.
    Speed = ___distance ÷ time___
    Distance = ___speed × time___
    Time = ___distance ÷ speed___

14. If Steve throws a football 50 meters in 3 seconds, what is the speed of the football?

$$\frac{50 \text{ meters}}{3 \text{ sec.}} = 16.6 \text{ m/s}$$

15. If it takes Ashley 3 seconds to run from the batters box to first base at a speed of 6.5 meters per second, what is the distance she covers in that time?

6.5m × 3s = 19.5m

16. Bart ran 5000 meters from a lion and a speed of 6 meters/second before he got caught. How many seconds did he run before getting caught?

$$\frac{5,000 \text{ m}}{6} = 833.3 \text{ s}$$

17. A race car completes 4 laps around a circular race track. The driver's distances and times are recorded below. Use the data to calculate the car's instantaneous speed for each lab, and then calculate the car's average speed for the entire 4 laps.

Lap #	Distance	Time	Inst. Speed	Average speed
1	2.5km	52sec	0.05 Km/s	10/218
2	2.5km	58sec	0.04 Km/s	
3	2.5km	48sec	0.05 Km/s	0.05 m/s
4	2.5km	60sec	0.04 Km/s	

Total distance
÷
Total Time

18. *True/False:* Speed also includes direction, while velocity does not include direction.

Topic 3: Acceleration – Binder entries page 10-12 textbook pg. 30-32

19. Acceleration is:
   a. The distance covered in a certain unit of time
   b. The distance between the starting point and the ending point
   c. The rate at which velocity changes

20. Match the definitions with the correct type of acceleration:

   B When an object slows down   A. Positive acceleration
   A When an object speeds up   B. Deceleration
   D When an object starts moving north   C. No acceleration
       and turns west   D. Change in direction
   **C** When an object has constant speed

21. At the top of a hill, a roller coaster car has a speed of 4 m/s. 3 seconds later, at the bottom of the hill, its speed is 22 m/s. What is its acceleration?

$$Acceleration = \frac{Final\ Speed - Initial}{Time} = \frac{22\,m/s - 4\,m/s}{3} = 6\,m/s^2$$

22. A rocket can accelerate from rest to 70 km/min in 2 minutes. Find the rocket's acceleration.

$$* Rest = 0\,m/s \qquad \frac{70\,Km/min - 0\,Km/min}{2\,min} = 35\,Km/min^2$$

23. Use the speed versus time graph to answer the following questions about a car's motion.
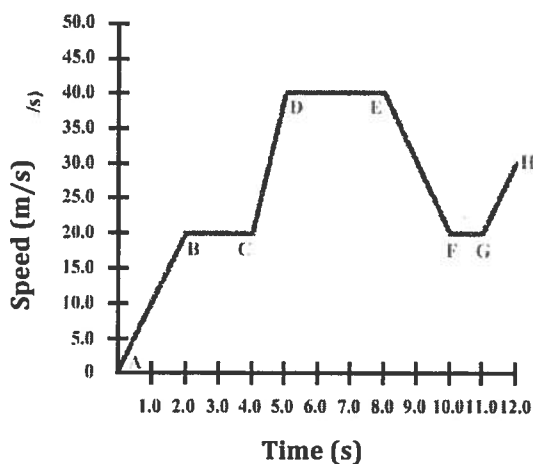
a) Between which points was the car accelerating?

$$A-B \ ; \ C-D \ ; \ G-H$$

b) Between which points was the car decelerating?

$$E-F$$

c) Between which points was the car not accelerating?

$$B-C \ ; \ D-E \ ; \ F-G$$