Name _____

GPS Web Quest

Go to http://www.trimble.com/gps/whygps.shtml to answer the following questions. Note: On this site, blue underlined words will open a drop box with more information. To close the box, click on the word again. Take the time to view the animations.

1. Name six other means of positioning systems used over the years.
   a. _____ b._____
   c. _____ d._____
   e. _____ f._____
2. Who developed worldwide positioning systems, and how much did it cost?

   _____
3. Why did the Department of Defense develop GPS? _____

   _____

On the left side of the page, click on "What is GPS."

4. Where are the five ground stations that monitor GPS satellites?
   a. _____ b._____
   c. _____ d._____
   e. _____
5. Name three advanced forms of GPS.

   a._____ b._____ c. _____

Go to "How GPS works."

6. What is the basis of GPS from satellites? _____
7. What is trilateration? _____

   _____

On the left side of the page under "How GPS works," click on "Triangulating."

8. Use Venn diagrams, and explain how triangulation works.

9. How can one of the two points found be ruled out? _____

   _____
10. Mathematically, how many satellites are needed? _____

Go to "Measurement."

11. How is the distance from a satellite to the earth measured? _____

    _____

12. In the case of GPS, what is being measured?_____ How fast is it going?

    _____ Instead of rate, it is called _____.

13. Using the formula, solve for a satellite directly overhead whose travel time is 0.06 seconds. Remember that the velocity is the speed of light. How many miles away is the satellite?

    _____

Go to "Getting Perfect Timing."

14. If the signal timing is off by a thousandth of a second, it would be _____ miles of error.
15. What does taking a fourth satellite reading do? _____

Go to "Satellite Positions."

16. According to the GPS master plan, the spacings of the satellites are arranged so that _____

    _____.

17. On the ground, all GPS receivers have an_____ programmed into their computers that tells them where in the sky each satellite is.
18. What are ephemeris errors, and what causes them? _____

    _____

Go to "Error Correction."

19. Draw and label the earth and atmospheres. Explain what is in each sphere, and tell which sphere interferes the most with the satellite signals.

20. How do things on the ground interfere with satellite signals? _____

    _____

21. What is selected availability, and which president was responsible for discontinuing it? _____

    _____

    _____

Go to "Differential GPS," and click on "Why we need Differential GPS."

22. What does differential GPS do? _____

Go to "How Differential GPS works."

23. What is the key that ties all the satellite measurements into a solid local reference?

_____

24. What is the big idea behind differential GPS?_____

_____

_____

Go to "Where to get differential corrections."

25. In the early days of GPS, who mainly had access to differential corrections, and what were they used for?

_____

_____

26. Where could you get free differential corrections? _____

Go to "Other ways to work with DGPS."

27. Explain post processing. _____

28. Explain inverted DGPS. _____

Click on "Advanced Concepts."

29. List two ways that DGPS might be headed._____

Click on "Putting GPS to work."

30. Real-world application of GPS falls into five categories. Name the categories, and give the definition of each.

a. _____

b._____

c. _____

d. _____

e. _____

Go to "Location" to answer the following questions.

31. What is the first and most obvious application of GPS?_____

Go to "Navigation."

32. What was GPS originally designed for? _____

33. What did Trimble do in 1985?_____

34. Explain how GPS helps planes. _____

_____

Go to "Tracking."

35. What does AVL sand for, and what is its function? _____

_____

Go to "Mapping."

36. GPS makes it possible for one surveyor to accomplish in one day what it used to take_____ for an entire team.

Go to "Timing."

37. GPS is well-known for _____, _____, and _____. It is also used to disseminate precise _____,_____, and _____.

38. Name and explain the three fundamental ways time is used.

a. _____

b. _____

c. _____