Aerodynamics

L= Cl x q x S

1. **What** are the forces that takes an airplane off the ground or what brings an aircraft back to earth??

2. **How** do these forces act together to achieve this state of equilibrium or a state of imbalance?

3. **Why** do we need to know this material????

The formula for Lift

L = Cl x q x S (q = V2 x p/2) V= velocity ; p= air density

DEFINE:

1. Four *Forces* of flight
   a. lift -
   b. weight -
   c. thrust -
   d. drag -

2. Bernoulli's Principle - {state cause and effect}

3. Newton's *Third Law of Motion* - {state cause and effect}

4. Name the parts of an *AIRFOIL -*
   a. leading edge -
   b. trailing edge -
   c. chord line -
   d. camber -
   e. relative wind -
   f. angle of attack -

5. What is aspect ratio? -

6. What does wing area do to aid/hamper lift?

7. What is a changing angle of attack and how does it effect performance?

8. What is a stall and how does it occur?

9. What is a spin? How does it occur? How does one recover?

10. Describe the four different types of flaps.
    a. plain -
    b. split -
    c. Fowler -
    d. slotted -

11. Draw the four basic airfoil shapes.

12. What are the two types of drag that effect an aircraft? (describe in detail)

13. Describe what is learned by the chart that is referred to as L/D max. {see chart}

14. What is the "BACK SIDE OF THE POWER CURVE", "Reverse Command"? {see chart}

15. How does changing airspeed, angle of attack, and configuration of flaps change lift?

16. Name the *Three Axis of Flight.*
_____, _____, _____

17. What control surfaces move the aircraft about these axes??
_____, _____, _____

18. How do the vectors of lift change from vertical to horizontal during a turn? {see diagram}

19. What is *ADVERSE YAW* and what is its cause? {see diagram}

20. What are G - forces (load factors)?{see diagram}

21. How are load factors affected during a turn? (20°, 45°, 60°, 75°)

22. What is the importance of Va. airspeed? Why is this not colored coded on the airspeed indicator?

23. What is CAS, TAS, IAS?

24. Since an airspeed indicator measures dynamic pressure,how does it affect these airspeeds?

25. What is longitudinal stability?

26. How does the center of pressure or center of lift change the pitching tendencies?

27. How can a forward/aft C.G. be effected by this pitching tendency?

28. How does the *Thrust Line* change the pitching tendencies of most general aviation aircraft?

29. Why is the CG of an aircraft always ahead of the center of lift if the aircraft is loaded properly?

30. How does dihedral, keel effect and sweepback maintain lateral stability?

31. What is Directional Stability? What motion is a result of directional instability?