



**Driver Operator Course
Fire Ground Hydraulics
PRE-COURSEWORK**

Study Guide I

To be completed and brought to Session I

Failure to comply will disqualify the candidate from the Driver Operator Course

DO NOT USE A CALCULATOR!

Answers can be found in Hydraulics Section of the Drill Manual.

Basic Math answers you need to find on your own.

1. Nozzle Pressure (NP) + Total Friction Loss (TFL) = _____.
2. The Friction Loss Rate (FLR) of fire hose can be determined by the formula $FLR = 2Q^2$. In this formula, $Q =$ _____.
3. List in order of importance, the facts that a pump operator needs in order to determine Pump Pressure (PP):
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____
 - g. _____
4. The Nozzle Pressure for a hand line with a smooth bore tip is _____.
5. The Nozzle Pressure for deluge sets, monitor nozzles or a water tower equipped with a smooth bore tip is _____.
6. The Nozzle Pressure for all adjustable or fog nozzles is _____.
7. The Nozzle Pressure for foam application is _____.

8. When pumping to a hose line used for an interior attack and the gpm setting is **not** known, you should use _____ as your maximum gpm flow.
9. When pumping to a hose line used for an exterior attack and the gpm setting is **not** known, you should use _____ as your maximum gpm flow.
10. When the gpm setting and use of the attack line are both unknown, you should pump to the _____ for that nozzle.
11. The formula $30d^2\sqrt{NP}$ is used to calculate _____.
12. The square root used for calculating the gpm of a hand held straight tip is _____ and that number is based on _____ psi.
13. The square root used for calculating the gpm of a straight tip used on a hose control or monitor is _____ and that number is based on _____ psi.
14. GPM flows for handheld smooth bore tip $\frac{1}{4}$ " to $\frac{3}{8}$ " are rounded to the nearest _____ gpm.
15. GPM flows for handheld smooth bore tips $\frac{1}{2}$ " to $1\frac{1}{4}$ " are rounded to the nearest _____ gpm.
16. GPM flows for smooth bore tips used on appliances $1\frac{1}{4}$ " to 2" are rounded to the nearest _____ gpm.
17. With a given flow through fire hose the smaller the diameter of the hose, the _____ amount of friction loss.
18. The maximum Pump Pressure for synthetic double jacket fire hose (attack line) is _____ psi.
19. The maximum Pump Pressure for $2\frac{1}{2}$ " high pressure double jacket fire hose is _____ psi.
20. The Equivalent Flow (EF) conversion for $\frac{3}{4}$ " hose is _____; 1" hose is _____; $1\frac{3}{4}$ " hose is 2; $3\frac{1}{2}$ " hose is _____; and 4" hose is _____.
21. After the EF is calculated, it should be rounded off to the nearest _____.
22. Length (L) is calculated by dividing the total length of hose in the lay by _____.
23. Water weighs _____ per gallon and requires _____ psi to raise this amount 1 foot. The number used to calculate Gravity Gain or Gravity Loss on the fire ground is _____ psi.
24. Gravity Gain (GG) is _____ from the Pump Pressure while Gravity Loss (GL) is _____ to the Pump Pressure.

25. The initial Pump Pressure for all hand lines is _____ + _____
26. The initial Pump Pressure for elevated master streams is _____ psi.
27. The initial Pump Pressure for Sprinkler and Standpipe Systems is _____ psi.
28. Convert the following fractions into decimals:

Example: $\frac{1}{2} = .50$

$\frac{1}{4} =$ _____ $\frac{3}{4} =$ _____ $\frac{1}{8} =$ _____ $\frac{3}{8} =$ _____

$\frac{5}{8} =$ _____ $\frac{7}{8} =$ _____ $1 \frac{1}{8} =$ _____ $1 \frac{3}{8} =$ _____

29. Solve the following problems:

$30 \times 1 \frac{3}{8} =$ _____ $30 \times 1 \frac{1}{4} \times 7 =$ _____

$30 \times 1 \frac{1}{2} \times 9 =$ _____ $30 \times 1 \frac{3}{4} \times 9 =$ _____

30. Solve the following problems:

$210 \times .67 =$ _____ $600 \times .4 =$ _____

$1100 \times .5 =$ _____ $30 \times 3.6 =$ _____