## Drug Calculations

A. 1:100 Solution contains 1 GRAM solute and 100 mL solvent.
B. 1:400 solution contains 1 GRAM solute and 400 mL solvent.
C. 1:1000 solution contains 1 GRAM solute and 1000 mL solvent.
D. A 10\% solution contains 10 GRAMS solute and 100 mL solvent.
E. A $40 \%$ solution contains 40 GRAMS solute and 100 mL solvent.
F. A 2:600 solution contains 2 GRAMS solute and 600 mL solvent.
G. The doctor ordered 0.5 mL of a 1:400 solution. How many mg are there in 0.5 ml ? $0.5 \mathrm{~mL} \times .25 \% \times 10=1.25 \mathrm{mg}$
H. The doctor ordered 250 mg of a 5\% solution of Lidocaine to be nebulized for a bronchoscopy. How many mL would you draw up?
$250 \mathrm{mg}=$ ? mL x $5 \times 10$
$250=$ ? mL x 50
5 mL
I. The doctor ordered 20 mg of Vaponephrine ( $2.25 \%$ solution). How many mL would you draw up?
$20 \mathrm{mg}=$ ? mL x $2.25 \times 10$
$20=$ ? mL x 22.5
0.89 mL
J. The doctor ordered 5 mg of a 1:100 solution of Isuprel. How many mL would you draw up?
$5 \mathrm{mg}=$ ? mL $\times 1 \% \times 10$
$5=? \mathrm{~mL} \times 10$
0.5 mL
K. How many mg are in 4 mL of $20 \%$ mucomyst?
? $\mathrm{mg}=4 \mathrm{~mL} \times 20 \% \times 10$
? $\mathrm{mg}=4 \times 20 \times 10=800 \mathrm{mg}$
L. You are requested to give an aerosol treatment with 10 mL of a 1:200 solution of Isuprel. How many mg of Isuprel would you be administering to the patient?
? $\mathrm{mg}=10 \mathrm{~mL} \times 0.5 \% \times 10$
? $\mathrm{mg}=10 \times 0.5 \times 10=50 \mathrm{mg}$
M. You are asked to administer 4 mL of $10 \%$ Mucomyst and all that is available is $20 \%$ Mucomyst. How much of the $20 \%$ solution would you use to give the same dose?
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(4 \mathrm{~mL})(10 \%)=\left(\mathrm{V}_{2}\right)(20 \%)$
$40=\left(\mathrm{V}_{2}\right)(20)$
$2 \mathrm{~mL}=\left(\mathrm{V}_{2}\right)$
N. Given 25 mL of a $4 \%$ solution, dilute to a concentration of $0.5 \%$.
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(25 \mathrm{~mL})(4 \%)=\left(\mathrm{V}_{2}\right)(0.5 \%)$
$100 \mathrm{~mL}=\mathrm{V}_{2} \times 0.5$
200 mL . You can accomplish a 0.5\% concentration by adding 175 mL
O. 100 mL of water is added to 350 mL of a $5 \%$ solution. Calculate the new concentration.
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(350 \mathrm{~mL})(5 \%)=(450 \mathrm{~mL})\left(\mathrm{C}_{2}\right)$
$1750=(450)\left(\mathrm{C}_{2}\right)$
$3.9 \%=C_{2}$
P. What volume of saline should be added to 100 mL of a $20 \%$ solution to dilute it to a 5\% solution?
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(100 \mathrm{~mL})(20 \%)=\left(\mathrm{V}_{2}\right)(5 \%)$
$2000=\left(V_{2}\right)(5)$
$400 \mathrm{~mL}=\mathrm{V}_{2}$ You need to add an additional 300 mL to get to a $5 \%$ solution
Q. If 10 mL is added to 6 mL of a $20 \%$ solution, what is the solutions final concentration?
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(6 \mathrm{~mL})(20 \%)=(16 \mathrm{~mL})\left(\mathrm{C}_{2}\right)$
$120=(16)\left(\mathrm{C}_{2}\right)$
$7.5 \%=C_{2}$
R. Given 40 mL of a $60 \%$ solution, dilute to a $35 \%$ solution.
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(40 \mathrm{~mL})(60 \%)=\left(\mathrm{V}_{2}\right)(35 \%)$
$2400=\left(\mathrm{V}_{2}\right)(35)$
$68.6 \mathrm{~mL}=\mathrm{V}_{2}$ You need to add 28.6 mL to get to a $35 \%$ solution
S. If 25 mL is added to 10 mL of a $40 \%$ solution, what is the solutions final concentration?
$\mathrm{V}_{1} \mathrm{C}_{1}=\mathrm{V}_{2} \mathrm{C}_{2}$
$(10 \mathrm{~mL})(40 \%)=(35 \mathrm{~mL})\left(\mathrm{C}_{2}\right)$
$400=(35)\left(\mathrm{C}_{2}\right)$
11.43\%
T. Bronkosol $0.5 \%$ solution contains 5 mg in 1 mL of solution?
$0.5 \%=0.5 \mathrm{~g} / 100 \mathrm{~mL}=500 \mathrm{mg} / 100 \mathrm{~mL}=5 \mathrm{mg} / \mathrm{mL}$
U. Alupent 5\% solution contains 50 mg in 1 mL of solution?
$5 \%=5 \mathrm{~g} / 100 \mathrm{~mL}=5000 \mathrm{mg} / 100 \mathrm{~mL}=50 \mathrm{mg} / \mathrm{mL}$
V. How many mg are in $0.6 \%$ Alupent unit dose containing 2.5 mL of normal saline? $\# \mathrm{mg}=2.5 \mathrm{~mL} \times 0.6 \% \times 10$
$\# \mathrm{mg}=2.5 \times .6 \times 10$
\# $\mathrm{mg}=15 \mathrm{mg}$
W. Isuprel 1:200 solution contains 5 mg in 1 mL of solution?
\# mg = $1 \mathrm{~mL} \times 0.5 \% \times 10$
\# mg = $1 \times 0.5 \times 10$
\# $\mathrm{mg}=5$
X. You have a 2.25\% Vaponephrine solution:
a. How many grams are in 100 mL ?
\# mg = $100 \mathrm{~mL} \times 2.25 \% \times 10$
\# mg = $100 \times 2.25 \times 10$
\# $\mathrm{mg}=\mathbf{2 , 2 5 0} \mathbf{~ m g}=2.25$ grams
b. How many mg are in 1 mL ?
\# mg = $1 \mathrm{~mL} \times 2.25 \% \times 10$
\# mg = $1 \times 2.25 \times 10$
\# mg = 22.5 mg
c. How much would you draw up to give 5.6 mg ?
$5.6 \mathrm{mg}=\# \mathrm{~mL} \times 2.25 \% \times 10$
5.6 = \# mL x 22.5
0.25 mL
Y. You have a 20\% Mucomyst solution:
a. How many grams are in 100 mL ?
\# mg = $100 \mathrm{~mL} \times 20 \% \times 10$
\# $\mathrm{mg}=20,000 \mathrm{mg}=20$ grams
b. How many mg are in 1 mL ?
\# mg = $1 \mathrm{~mL} \times 20 \% \times 10$
\# mg = 200 mg
c. How much solution would you draw up if the physician ordered 300 mg ?

300 mg = \# mL x 20\% x 10
300 = \# mL x 200
1.5 mL
Z. You have a 1:200 Isuprel solution.
a. How much would you draw up if the physician ordered 2.5 mg ?
$2.5 \mathrm{mg}=\# \mathrm{~mL} \times 0.5 \% \times 10$
2.5 = \# mL x 5
0.5 mL

