

Example Questions

Mass of base for a certain pH

eg) What mass of $\text{Sr}(\text{OH})_2$ ^(base) needs to be added to 300.0 mL of soln. in order to prepare a solution with a pH = 12.56 (2SD)

Plan: $\text{pH} \rightarrow \text{pOH} \rightarrow [\text{OH}^-] \rightarrow [\text{Sr}(\text{OH})_2] \rightarrow \text{mol Sr}(\text{OH})_2 \rightarrow \text{g Sr}(\text{OH})_2$
(M)

$$\text{pOH} = 14.00 - 12.56 = 1.44$$

$$[\text{OH}^-] = \text{antilog}(-1.44) = 0.036308 \text{ M}$$



$$[\text{Sr}(\text{OH})_2] = 0.036308 \text{ M OH}^- \times \frac{1 \text{ M Sr}(\text{OH})_2}{2 \text{ M OH}^-} = 0.0181539 \text{ M}$$

$\frac{\text{mol}}{\text{MIL}}$

$$\text{mol} = \text{M} \times \text{L} = 0.0181539 \text{ M} \times 0.3000 \text{ L} = 0.005446 \text{ mol}$$

$$\text{mass} = 0.005446 \text{ mol Sr}(\text{OH})_2 \times \frac{121.6 \text{ g}}{1 \text{ mol}} = \underline{0.66 \text{ g}}$$

Dilution Questions With pH

eg) How much water do you add to change one pH to another?

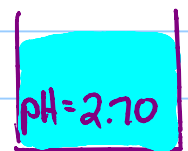
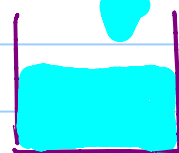
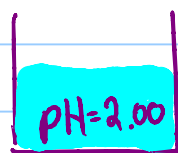
Plan: ① Convert both pH's to $[H_3O^+]$

② Use Dilution formula
(eg. To calculate FV)

$$FC \times FV = IC \times IV$$

③ Use $WA = FV - IV$

eg) How much water needs to be added to 350.0 mL of a solution with a pH = 2.00 to bring the pH to 2.70? (2.50)



	pH	$[H_3O^+]$	Volume
Initial	2.00	0.010 M (IC)	350.0 mL ^(IV)
Final	2.70	0.0019953 M (FC)	FV = ?

$$FV \times FC = IV \times IC$$

$$FV = \frac{IV \times IC}{FC} = \frac{350.0 \text{ mL} \times 0.010 \text{ M}}{0.0019953 \text{ M}}$$

$$FV = \underline{\underline{1754.1553 \text{ mL}}}$$

$$WA = FV - IV$$

$$= 1754.1553 \text{ mL} - 350.0 \text{ mL} = \underline{1404.1553 \text{ mL}}$$

$$\text{Ans. : } \underline{1400 \text{ mL}} (1.4 \times 10^3 \text{ mL})$$

(2SD) → (1.4 L)