

79)



$$K_{sp} = [\text{Ag}^+][\text{C}_2\text{H}_3\text{O}_2^-]$$



$$K_{sp} = [\text{Al}^{3+}][\text{OH}^-]^3$$



$$K_{sp} = [\text{Ca}^{2+}]^3[\text{PO}_4^{3-}]^2$$



$$K_{sp} = [\text{Ca}^{2+}][\text{C}_2\text{O}_4^{2-}]$$

$$K_{sp} = (4.8 \times 10^{-5})^2$$

$$K_{sp} = 2.3 \times 10^{-9}$$



$$K_{sp} = [\text{Bi}^{3+}][\text{I}^-]^3$$

$$= (1.32 \times 10^{-5})(3 \times 1.32 \times 10^{-5})^3$$

$$= 8.20 \times 10^{-19}$$



$$K_{sp} = [\text{Pb}^{2+}][\text{Br}^{-}]^2$$

$$= (2.14 \times 10^{-2})(2 \times 2.14 \times 10^{-2})^2$$

$$= 3.92 \times 10^{-5}$$



$$K_{sp} = [\text{Ag}^{+}]^3[\text{PO}_4^{3-}]$$

$$1.8 \times 10^{-18} = (3x)^3(x)$$

$$1.8 \times 10^{-18} = 27x^4$$

$$x = 1.6 \times 10^{-5} \text{ M}$$



$$K_{sp} = [\text{Ca}^{2+}][\text{CO}_3^{2-}]$$

$$8.7 \times 10^{-9} = x^2$$

$$9.3 \times 10^{-5} \text{ M} = x$$



$$K_{sp} = [\text{Hg}_2^{2+}][\text{Cl}^{-}]^2$$

$$1.1 \times 10^{-18} = (x)(2x)^2$$

$$1.1 \times 10^{-18} = 4x^3$$

$$x = 6.8 \times 10^{-7} \text{ M}$$



$$K_{sp} = [\text{Co}^{3+}][\text{OH}^{-}]^3$$

$$2.5 \times 10^{-43} = (x)(3x)^3$$

$$2.5 \times 10^{-43} = (x)(1.0 \times 10^{-7} + 3x)^3$$

* water present



$$2.5 \times 10^{-43} = x(1.0 \times 10^{-21})$$

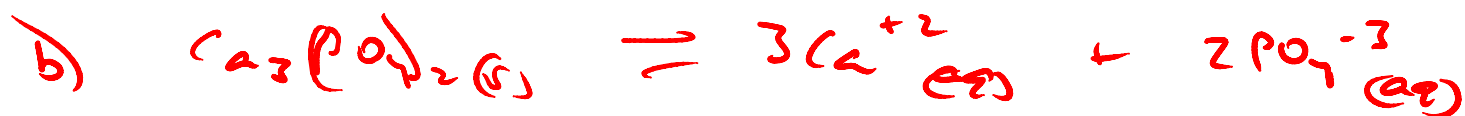
$$x = 2.5 \times 10^{-22} \text{ M}$$

$$\frac{\text{90 rule}}{3(2.5 \times 10^{-22})} \times 100 = 7.5 \times 10^{-13} \text{ 90} \checkmark$$



same K_{sp} expression



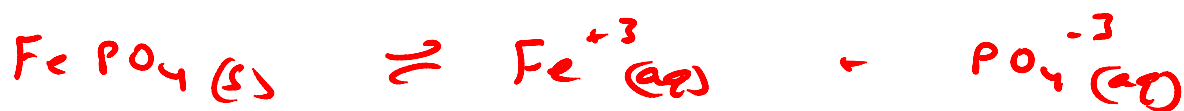


$$K_{sp} = [\text{Ca}^{+2}]^3 [\text{PO}_4^{-3}]^2$$

$$1.3 \times 10^{-32} = (3x)^3 (2x)^2$$

$$1.3 \times 10^{-32} = 108x^5$$

$$x = 1.64 \times 10^{-7} \text{ M}$$



$$K_{sp} = [\text{Fe}^{+3}][\text{PO}_4^{-3}]$$

$$1.0 \times 10^{-22} = x^2$$

$$x = 1.0 \times 10^{-11} \text{ M}$$

