

CHAPTER 6	Calculating pOH and Changing from pH to pOH Answer Key	BLM 6.3.10A
ANSWER KEY		

1.

(a) $\text{pOH} = -\log[\text{OH}^-(\text{aq})]$

$$\text{pOH} = -\log\left(4.67 \times 10^{-3} \frac{\text{mol}}{\text{L}}\right)$$

$$\text{pOH} = 2.331$$

(c) $\text{pOH} = -\log[\text{OH}^-(\text{aq})]$

$$\text{pOH} = -\log\left(1.478 \times 10^{-14} \frac{\text{mol}}{\text{L}}\right)$$

$$\text{pOH} = 13.8303$$

(b) $\text{pOH} = -\log[\text{OH}^-(\text{aq})]$

$$\text{pOH} = -\log\left(5.84 \times 10^{-8} \frac{\text{mol}}{\text{L}}\right)$$

$$\text{pOH} = 7.234$$

(d) $\text{pOH} = -\log[\text{OH}^-(\text{aq})]$

$$\text{pOH} = -\log\left(3.4 \times 10^{-2} \frac{\text{mol}}{\text{L}}\right)$$

$$\text{pOH} = 1.47$$

2. Solutions (b) and (c) are acidic.

3. $\text{pH} = 14 - \text{pOH}$

$$\text{pOH} = 14 - \text{pH}$$

(a) $\text{pOH} = 1.7$

(b) $\text{pH} = 8.5$

(c) $\text{pH} = 11.05$

(d) $\text{pOH} = 7.371$

(e) $\text{pH} = 12.9$

4.

$[\text{OH}^-(\text{aq})] \text{ mol/L}$	pOH	pH
1.28	-0.107	14.107
5.35×10^{-3}	2.272	11.728
8.459×10^{-5}	4.0727	9.9273
9.6×10^{-8}	7.02	6.98
1.934×10^{-15}	14.7135	-0.7135

**Note that two of the answers show a negative pH or pOH. While the pH and pOH scales were defined so that most acidic and basic solutions would fall within the range from 0 to 14, it is possible for concentrated strong acids or bases to fall outside this range.*

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5. As acidity increases, pH decreases and pOH increases.

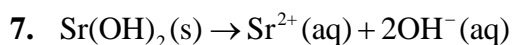


$$3.2 \frac{\text{mol}}{\text{L}} \text{Sr(OH)}_2(\text{aq}) \times \frac{1 \text{ mol OH}^-(\text{aq})}{1 \text{ mol LiOH(aq)}} = 3.2 \frac{\text{mol}}{\text{L}} \text{OH}^-(\text{aq})$$

$$\text{pOH} = -\log[\text{OH}^-(\text{aq})]$$

$$\text{pOH} = -\log(3.2)$$

$$\text{pOH} = -0.51$$



$$5.467 \frac{\text{mol}}{\text{L}} \text{Sr(OH)}_2(\text{s}) \times \frac{2 \text{ mol OH}^-(\text{aq})}{1 \text{ mol Sr(OH)}_2(\text{s})} = 10.934 \frac{\text{mol}}{\text{L}}$$

$$\text{pOH} = -\log[\text{OH}^-(\text{aq})]$$

$$\text{pOH} = -\log\left(10.934 \frac{\text{mol}}{\text{L}}\right)$$

$$\text{pOH} = -1.0388$$



$$3.45 \frac{\text{mol}}{\text{L}} \text{NaOH(aq)} \times \frac{1 \text{ mol OH}^-(\text{aq})}{1 \text{ mol NaOH(aq)}} = 3.45 \frac{\text{mol}}{\text{L}} \text{OH}^-(\text{aq})$$

$$\text{pOH} = -\log[\text{OH}^-(\text{aq})]$$

$$\text{pOH} = -\log(3.45)$$

$$\text{pOH} = -0.538$$

$$\text{pH} = 14 - \text{pOH}$$

$$\text{pH} = 14 - (-0.538)$$

$$\text{pH} = 14.538$$



$$4.95 \text{ g KOH(s)} \times \frac{1 \text{ mol}}{56.11 \text{ g}} \times \frac{1}{4.50 \text{ L}} \times \frac{1 \text{ mol OH}^-(\text{aq})}{1 \text{ mol KOH(aq)}} = 0.0196 \frac{\text{mol}}{\text{L}} \text{OH}^-(\text{aq})$$

$$\text{pOH} = -\log[\text{OH}^-(\text{aq})]$$

$$\text{pOH} = -\log(0.0196)$$

$$\text{pOH} = 1.708$$