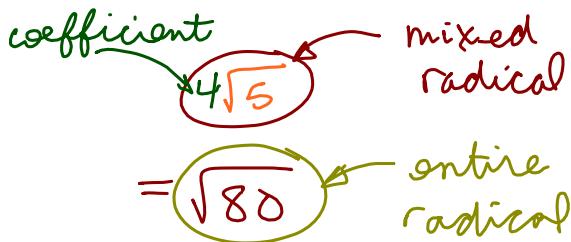
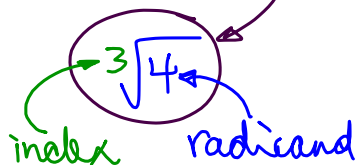


5.1 Radicals

Vocabulary review:



Definition: we say two radicals are similar if they have the same index and the same radicand.

ex. $3\sqrt{2}$ and $5\sqrt{2}$
 $7\sqrt[3]{5}$ and $-6\sqrt[3]{5}$

counterexamples
 $2\sqrt{5}$ and $2\sqrt[5]{5}$
 $2\sqrt{7}$ and $2\sqrt{4}$
 NOT similar

Recall: 1) writing an entire radical in mixed radical form:

- * with a square root, look for factors of the radicand that are perfect square roots
- * with a cube root, look for factors of the radicand that are perfect cube roots

ex. a) $\sqrt{125}$ b) $\sqrt{108x^5}$ c) $\sqrt[3]{32}$

$$= \sqrt{25 \cdot 5}$$

$$= \sqrt{25} \cdot \sqrt{5}$$

$$= 5\sqrt{5}$$

$$= \sqrt{36 \cdot 3 \cdot x^4 \cdot x}$$

$$= \sqrt{36} \cdot \sqrt{3} \cdot \sqrt{x^4} \cdot \sqrt{x}$$

$$= 6\sqrt{3} \cdot x^2 \sqrt{x}$$

$$= 6x^2 \sqrt{3x}$$

$$= \sqrt[3]{8 \cdot 4}$$

$$= \sqrt[3]{8} \cdot \sqrt[3]{4}$$

$$= 2\sqrt[3]{4}$$

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exponent	2	3	4	5	6	7	8	9	10	
base	2	4	8	16	32	64	128	256	512	1024
	3	9	27	81	243	729				
	4	16	64	256	1024					
	5	25	125	625						
	6	36	216							
	7	49	343							
	8	64	512							
	9	81	729							

Recall: 2) writing a mixed radical in entire radical form:

* with a square root, square the coefficient and multiply it by the radicand; the radicand is now larger

* with a cube root, cube the coefficient and multiply it by the radicand; the radicand is now larger

ex. a) $7\sqrt{2}$

$$= \sqrt{7^2 \cdot 2}$$

$$= \sqrt{49 \cdot 2}$$

$$= \sqrt{98}$$

b) $x^4\sqrt{x}$

$$= \sqrt[4]{x^4 \cdot x}$$

$$= \sqrt[4]{x^5}$$

c) $5b^3\sqrt[3]{3b^2}$

$$= \sqrt[3]{(5b)^3 3b^2}$$

$$= \sqrt[3]{5^3 b^3 \cdot 3b^2}$$

$$= \sqrt[3]{375 b^5}$$

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a) $\sqrt{72} = 3\sqrt{4 \cdot 2}$
 $= \sqrt{9 \cdot 8} = 3 \cdot 2\sqrt{2} = 6\sqrt{2}$
 $= 3\sqrt{8}$

b) $4\sqrt[4]{m^7}$

$$= \sqrt[4]{m^4 \cdot m^3}$$

$$= m\sqrt[4]{m^3}$$

c) $4\sqrt[4]{3} = \sqrt{16 \cdot 3} = \sqrt{48}$

d) $(2k^2)^3 (\sqrt[3]{4k})$

$$= \sqrt[3]{4k (2k^2)^3}$$

$$= \sqrt[3]{4k \cdot 8k^6}$$

$$= \sqrt[3]{32k^7}$$

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