

7.6 Rational Exponents (pg 446)

EX#1 a) $x^{1/6} = \sqrt[6]{x} = \sqrt[3]{\sqrt{x}}$ | $b^{1/n} = \sqrt[n]{b}$

b) $\sqrt[3]{27} = 27^{1/3} = 3$

1A) $a^{1/5} = \sqrt[5]{a}$

1B) $\sqrt[3]{c} = c^{1/3}$
 $\sqrt[4]{c^{-3}} = c^{-3/4} = \frac{1}{c^{3/4}}$

EX 2a) $81^{-1/4} = \frac{1}{81^{1/4}} = \frac{1}{\sqrt[4]{81}} = \frac{1}{\sqrt[4]{3^4}} = \frac{1}{3}$

b) $216^{2/3} = (2^3 \cdot 3^3)^{2/3} = 2^2 \cdot 3^2 = 36$

$6^3 = 2^3 \cdot 3^3$

2A) $-3125^{-1/5} = \frac{1}{-3125^{1/5}} = \frac{1}{-5^5^{1/5}} = \frac{1}{-5} = -\frac{1}{5}$

2B) $256^{3/8} = (2^8)^{3/8} = 2^3 = 8$

EX#3: $C = C(1+r)^n$
 $390(1+.05)^{1/2}$
 $390(1.053)^{1/2}$
 $390(1.026)$

$C = 400.20$

$a^m \cdot a^n = a^m$

EX#4) $a^3 + a^{1/7}$

$a^{1/7}$

b) $b^{-3/6} = \frac{1}{b^{3/6}} = \frac{1}{b^{1/2}}$

EX#5a) $\frac{4\sqrt{27} \cdot 3^3}{2\sqrt{3}} = \frac{3^4}{3^{1/2}} = 3^{7/2} = 3^3 \cdot 3^{1/2} = 27\sqrt{3}$

b) $\sqrt[3]{64z^6} = (64z^6)^{1/3} = (2^2 z^2)^{1/3} = 2^{2/3} z^{2/3}$

c) $\frac{x^{1/2} - 2}{3x^{1/2} + 2} \cdot \frac{(3x^{1/2} - 2)}{(3x^{1/2} - 2)} = \frac{3x - 7x^{1/2} - 6x^{1/2} + 4}{9x - 6x^{1/2} + 6x^{1/2} - 4} = \frac{3x - 8x^{1/2} + 4}{9x - 4}$

$\frac{3x - 8x^{1/2} + 4}{9x - 4}$

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EX#1a) $x^{\frac{1}{6}} = \sqrt[6]{x^1} = \sqrt[6]{x}$ $b^{\frac{1}{n}} = \sqrt[n]{b}$

b) $\sqrt[4]{z^1} = z^{\frac{1}{4}}$

1A) $a^{\frac{1}{5}} = \sqrt[5]{a}$

1B) $\sqrt[3]{c} = c^{\frac{1}{3}}$

c) $d^{\frac{1}{4}} = \sqrt[4]{d}$

d) $\sqrt[3]{c^{-5}} = c^{-\frac{5}{3}} = \frac{1}{c^{\frac{5}{3}}}$

EX 2a) $81^{-\frac{1}{4}} = \frac{1}{81^{\frac{1}{4}}} = \frac{1}{\sqrt[4]{81}} = \frac{1}{\sqrt[4]{3^4}} = \frac{1}{3}$

b) $216^{\frac{2}{3}} = \sqrt[3]{216^2} = \sqrt[3]{46656} = 36$

$6^3 = 2^3 \cdot 3^3$

2A) $-3125^{-\frac{1}{5}} = \frac{1}{-3125^{\frac{1}{5}}} = \frac{1}{\sqrt[5]{-3125}} = \frac{-1}{5}$

2B) $256^{\frac{3}{8}} = \sqrt[8]{256^3} = \sqrt[8]{16777216} = 128$

EX#3: $C = C(1+r)^n$

$390(1+.058)^{\frac{1}{2}}$

$390(1.058)^{\frac{1}{2}}$

$390(1.029)$

$C = 400.20$

$a^1 \cdot a^3 = a^4$

EX#4 a) $a^{\frac{2}{7}} \cdot a^{\frac{4}{7}} = a^{\frac{6}{7}}$

$a^{\frac{6}{7}}$

b) $b^{-\frac{5}{6}} = \frac{1}{b^{\frac{5}{6}}} = \frac{1}{b^{\frac{10}{12}}} = \frac{1}{b^{\frac{5}{6}}}$

EX#5a) $\frac{\sqrt[4]{27} \cdot 3}{\sqrt[3]{3}} = \frac{3^{\frac{3}{4}} \cdot 3}{3^{\frac{1}{2}}} = 3^{\frac{3}{4} + 1 - \frac{1}{2}} = 3^{\frac{3}{4} + \frac{1}{2}} = 3^{\frac{5}{4}} = 3^{\frac{1}{4}} \cdot 3 = \sqrt[4]{3} \cdot 3$

b) $\sqrt[3]{64z^6} = (64z^6)^{\frac{1}{3}} = (8^2 z^6)^{\frac{1}{3}} = 8^{\frac{2}{3}} z^2$

c) $\frac{x^{\frac{1}{2}} \cdot 2 \cdot (3x^{\frac{1}{2}} - 2)}{3x^{\frac{1}{2}} + 2} = \frac{3x - 2x^{\frac{1}{2}} - 6x^{\frac{1}{2}} + 4}{9x - 6x^{\frac{1}{2}} + 6x^{\frac{1}{2}} - 4} = \frac{3x - 8x^{\frac{1}{2}} + 4}{9x - 4}$

$\frac{-3x - 8x^{\frac{1}{2}} + 4}{9x - 4}$

$(2^{\frac{2}{3}})^{\frac{3}{2}} z^2 = 4z^2$