# Exercise 4(B)

1) i) 64
= (4 x 4 x 4)
= 4

ii) 343
= (7 x 7 x 7)
= 7

iii) 729
= (9 x 9 x 9)
= 9

iv) 1728
= 2x2x2x2x2x2x3x3x3
= (2x2x2) x (2x2x2) x (3x3x3)
= 2 x 2 x 3
= 12

| | |
|---|---|
| 2 | 1728 |
| 2 | 864 |
| 2 | 432 |
| 2 | 216 |
| 2 | 108 |
| 2 | 54 |
| 3 | 27 |
| 3 | 9 |
| | 3 |

v) 9261
= 21 x 21 x 21
= 21

vi) 4096
= 2x2x2x2x2x2x2x2x2x2x2x2
= (2x2x2) x (2x2x2) x (2x2x2) x (2x2x2)
= 2 x 2 x 2 x 2
= 16

| | |
|---|---|
| 2 | 4096 |
| 2 | 2048 |
| 2 | 1024 |
| 2 | 512 |
| 2 | 256 |
| 2 | 128 |
| 2 | 64 |
| 2 | 32 |
| 2 | 16 |
| 2 | 8 |
| 2 | 4 |
| | 2 |

vii) 8000

$= 2\times2\times2\times2\times2\times2\times5\times5\times5$

$= (2\times2\times2)\times(2\times2\times2)\times(5\times5\times5)$

$= 2\times2\times5$

$= 20$

| | |
|---|---|
| 2 | 8000 |
| 2 | 4000 |
| 2 | 2000 |
| 2 | 1000 |
| 2 | 500 |
| 2 | 250 |
| 5 | 125 |
| 5 | 25 |
| | 5 |

viii) 3375

$= 3\times3\times3\times5\times5\times5$

$= (3\times3\times3)\times(5\times5\times5)$

$= 3\times5$

$= 15$

| | |
|---|---|
| 3 | 3375 |
| 3 | 1125 |
| 3 | 375 |
| 5 | 125 |
| 5 | 25 |
| | 5 |

2) i) $\frac{27}{64}$

$= \frac{3\times3\times3}{4\times4\times4}$

$= \frac{3}{4}$

ii) $\frac{125}{216}$

$= \frac{5\times5\times5}{6\times6\times6}$

$= \frac{5}{6}$

iii) $\frac{343}{512}$

$= \frac{7\times7\times7}{8\times8\times8}$

$= \frac{7}{8}$

iv) $64 \times 729$

$= \frac{4\times4\times4 \times 9\times9\times9}{4\times9}$

$= 36$

v) $64 \times 27$

$= \frac{4\times4\times4 \times 3\times3\times3}{4\times3}$

$= 12$

vi) $729 \times 8000$

$= \frac{9\times9\times9 \times 20\times20\times20}{9 \times 20}$

$= 180$

vii) $3375 \times 512$

$= \frac{15\times15\times15 \times 8\times8\times8}{15\times8}$

$= 120$

viii) $\sqrt[3]{216}$

$= \sqrt[3]{(-6)\times(-6)\times(-6)}$

$= -6$

ix) $\sqrt[3]{-512}$

$= \sqrt[3]{(-8)\times(-8)\times(-8)}$

$= -8$

x) $\sqrt[3]{-1331}$

$= \sqrt[3]{(-11)\times(-11)\times(-11)}$

$= -11$

iv) $\sqrt[3]{-\frac{27}{125}}$

$= \sqrt[3]{\frac{3\times3\times3}{5\times5\times5}}$

$= -\frac{3}{5}$

v) $\sqrt[3]{\frac{-64}{343}}$

$= \sqrt[3]{\frac{4\times-4\times-4}{7\times7\times7}}$

$= \frac{-4}{7}$

vi) $\sqrt[3]{\frac{512}{343}}$

$= \sqrt[3]{\frac{8\times8\times8}{7\times7\times7}}$

$= \frac{8}{7}$

vii) $\sqrt[3]{-2197}$

$= \sqrt[3]{(-13)\times(-13)\times(-13)}$

$= -13$

| | |
|---|---|
| 2 | 5832 |
| 2 | 2916 |
| 2 | 1458 |
| 3 | 729 |
| 3 | 243 |
| 3 | 81 |
| 3 | 27 |
| 3 | 9 |
| | 3 |

viii) $\sqrt[3]{-5832}$

$= \sqrt[3]{(-2)\times(-2)\times(-2)\times(-3)\times(-3)\times(-3)\times(-3)\times(-3)\times(-3)}$

$(-2)\times(-3)\times(-3)\times(-3)$

$= -18$

ix) $\sqrt[3]{-2744000}$

$= \sqrt[3]{(-140) \times (-140) \times (-140)}$

$= -140$

x) $\sqrt[3]{2.744}$

$= \sqrt[3]{\frac{2744}{1000}}$

$= \sqrt[3]{\frac{2 \times 2 \times 2 \times 7 \times 7 \times 7}{10 \times 10 \times 10}}$

$= \frac{2 \times 7}{10} = \frac{14}{10} = 1.4$

xi) $\sqrt[3]{9.261}$

$= \sqrt[3]{\frac{9261}{1000}}$

$= \sqrt[3]{\frac{21 \times 21 \times 21}{10 \times 10 \times 10}}$

$= \frac{21}{10} = 2.1$

xii) $\sqrt[3]{0.000027}$

$= \sqrt[3]{\frac{27}{1000000}}$

$= \sqrt[3]{\frac{3 \times 3 \times 3}{10 \times 10 \times 10 \times 10 \times 10 \times 10}}$

$= \frac{3}{10 \times 100} = \frac{3}{100} = 0.03$

iv) $\sqrt[3]{0.512}$

$= \sqrt[3]{\frac{512}{1000}}$

$= \sqrt[3]{\frac{8 \times 8 \times 8}{10 \times 10 \times 10}}$

$= \frac{8}{10} = 0.8$

v) $\sqrt[3]{-15.625}$

$= \sqrt[3]{\frac{-15625}{1000}}$

$= \sqrt[3]{\frac{5 \times 5 \times 5 \times 5 \times 5 \times 5}{10 \times 10 \times 10}}$

$= -\frac{5 \times 5}{10} = -\frac{25}{10} = -2.5$

| | |
|---|---|
| 5 | 15625 |
| 5 | 3125 |
| 5 | 625 |
| 5 | 125 |
| 5 | 25 |
| | 5 |

vi) $\sqrt[3]{125 \times 1000}$

$= \sqrt[3]{(-5) \times (-5) \times (-5) \times -10 \times -10 \times 10}$

$= -5 \times -10$

$= 50$

5) 26244

Prime factors of 26244

$= 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

$= 2^2 \times 3^2$

$= 9 \times 4 = 36$

| | |
|---|---|
| 2 | 26244 |
| 2 | 13122 |
| 3 | 6561 |
| 3 | 2187 |
| 3 | 729 |
| 3 | 243 |
| 3 | 81 |
| 3 | 27 |
| 3 | 9 |
| | 3 |

∴ 26244 must be devided by 36.

6) 30375

Prime factor of 30375

$= \underline{3\times3\times3\times3\times3}\times\underline{5\times5\times5}$

$= 3$

∴ 30375 must be multiplied by 3 to get a perfect cube.

| | |
|---|---|
| 3 | 30375 |
| 3 | 10125 |
| 3 | 3375 |
| 3 | 1125 |
| 3 | 375 |
| 5 | 125 |
| 5 | 25 |
| | 5 |

7) (a) $\sqrt[3]{700\times2\times49\times5}$

$= \sqrt[3]{2\times2\times5\times5\times7\times7\times7\times5\times2}$

$= \sqrt[3]{\underline{2\times2\times2}\times\underline{5\times5\times5}\times\underline{7\times7\times7}}$

$= 2\times5\times7$

$= 70$

| | |
|---|---|
| 2 | 700 |
| 2 | 350 |
| 5 | 175 |
| 5 | 35 |
| | 7 |

(b) (i) $\sqrt[3]{-216\times1728}$

$= \sqrt[3]{(-6)\times(-6)\times(-6)\times\underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{3\times3\times3}}$

$= -6\times2\times2\times3$

$= -72$

(ii) $\sqrt[3]{-64\times-125}$

$= \sqrt[3]{(-4)\times(-4)\times(-4)\times(-5)\times(-5)\times(-5)}$

$= -4\times-5$

$= 20$

iv) $\sqrt[3]{\frac{27}{343}}$

$= \sqrt[3]{-\frac{3\times3\times3}{7\times7\times7}}$

$= -\frac{3}{7}$

v) $\sqrt[3]{\frac{729}{-1331}}$

$= \sqrt[3]{\frac{9\times9\times9}{-11\times-11\times-11}}$

$= \frac{9}{-11} = -\frac{9}{11}$

vi) $\sqrt[3]{250.047}$

$= \sqrt[3]{\frac{250047}{1000}}$

$= \sqrt[3]{\frac{(3\times3\times3)\times(3\times3\times3)\times(7\times7\times7)}{(10\times10\times10)}}$

$= \frac{3\times3\times7}{10}$

$= \frac{63}{10} = 6.3$

vii) $\sqrt[3]{-175616}$

$= \sqrt[3]{(-2)\times(-2)\times(-2)\times(-2)\times(-2)\times(-2)\times(-2)\times(-7)\times(-7)\times(-7)}$

$= -2 \times -2 \times -2 \times -7$

$= -56$