Exercise 4B

~~ii) 1800~~

ii) $64 = (2\times2\times2)\times(2\times2\times2)$

$\sqrt{64} = (2^3)\times(2^3) = (2\times2)^3$

$\sqrt[3]{64} = 2\times2 = 4$

2	64
2	32
2	16
2	8
2	4
2	2
	1

iii) $343 = (7\times7\times7) = 7^3$

$\sqrt[3]{343} = 7^3$

7	343
7	49
7	7
	1

iii) $729 = (3\times3\times3)\times3\times3\times3$

$\sqrt{729} = (3^3)\times(3^3) = (3\times3)^3$

$\sqrt[3]{729} = 3\times3 = 9$

3	729
3	243
3	81
3	27
3	9
3	3
	1

iv) $1728 = (2\times2\times2)\times(2\times2\times2)\times(3\times3\times3)$

$\sqrt{1728} = (2^3)\times(2^3)\times(3^3) = (2\times2\times3)^3$

$\sqrt[3]{1728} = 2\times2\times3 = 12$

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

v) $9261 = (3\times3\times3)\times(7\times7\times7)$

$\sqrt{9261} = 3^3\times7^3 = (3\times7)^3$

$\sqrt[3]{9261} = 3\times7 = 21$

3	9261
3	3087
3	1029

iv) $1728 = (2\times2\times2)\times(2\times2\times2)\times(3\times3\times3)$

$\sqrt{1728} = (2^3)\times(2^3)\times(3^3) = (2\times2\times3)^3$

$\sqrt[3]{1728} = 2\times2\times3 = 12$

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

v) $9261 = (3\times3\times3)\times(7\times7\times7)$

$\sqrt{9261} = 3^3\times7^3 = (3\times7)^3$

$\sqrt[3]{9261} = 3\times7 = 21$

3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

vi) $4096 = (2\times2\times2)\times(2\times2\times2)\times(2\times2\times2)\times(2\times2\times2)$

$\sqrt{4096} = (2^3)\times(2^3)\times(2^3)\times(2^3)$

$= (2\times2\times2\times2)^3$

$\sqrt[3]{4096} = 2\times2\times2\times2 = 16$

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

vii) $8000 = (2\times2\times2)\times(2\times2\times2)\times(5\times5\times5)$

$\sqrt{8000} = (2^3)\times(2^3)\times(5^3) = (2\times2\times5)^3$

$\sqrt[3]{8000} = 2\times2\times5 = 20$

2	8000
2	4000
2	2000
2	1000
2	500
2	250
5	125
5	25
5	5
	1

viii) $3375 = (3 \times 3 \times 3) \times (5 \times 5 \times 5)$

$\sqrt{3375} = 3^3 \times 5^3 = (3 \times 5)^3$

$\sqrt[3]{3375} = 3 \times 5 = 15$

3	3375
3	1125
3	375
5	125
5	25
5	5
	1

2) i) $\frac{27}{64} = \sqrt[3]{\frac{27}{64}}$

$= \frac{\sqrt{3 \times 3 \times 3}}{\sqrt{4 \times 4 \times 4}} = \frac{3}{4}$

3	27
3	9
3	3
	1

2	64
2	32
2	16
2	8
2	4
2	2
	1

ii) $\frac{125}{216} = \sqrt[3]{\frac{125}{216}} = \frac{\sqrt{5 \times 5 \times 5}}{\sqrt{6 \times 6 \times 6}} = \frac{5}{6}$

5	125
5	625
5	5
	1

6	216
6	36
6	6
	1

iii) $\frac{343}{512} = \sqrt[3]{\frac{343}{512}} = \frac{\sqrt{7 \times 7 \times 7}}{\sqrt{8 \times 8 \times 8}} = \frac{7}{8}$

7	343
7	49
7	7
	1

8	512
8	64
8	8
	1

iv) $64 \times 729 = \sqrt[3]{64 \times 729}$

$= \sqrt{4 \times 4 \times 4 \times 9 \times 9 \times 9} = 4 \times 9 = 36$

9	729
9	81
9	9
	1

v) $64 \times 27 = \sqrt[3]{64 \times 27}$

$= \sqrt{4 \times 4 \times 4 \times 3 \times 3 \times 3} = 4 \times 3 = 12$

vi) $729 \times 8000 = \sqrt[3]{729 \times 8000}$

vi) $64 \times 27 = \sqrt[3]{64 \times 27}$

$= \sqrt{4 \times 4 \times 4 \times 3 \times 3 \times 3} = 4 \times 3 = 12$

8	512	1
8	64	9 | 729
8	8	9 | 81
	1	9 | 9
		1

vii) $729 \times 8000 = \sqrt[3]{729 \times 8000}$

$= \sqrt{9 \times 9 \times 9 \times 20 \times 20 \times 20} = 9 \times 20 = 180$

viii) $3375 \times 512 = \sqrt[3]{3375 \times 512}$

$= \sqrt{15 \times 15 \times 15 \times 8 \times 8 \times 8} = 15 \times 8 = 120$

3) i) $-216 = \sqrt[3]{-216} = \sqrt{-6 \times -6 \times -6} = -6$

ii) $-512 = \sqrt[3]{-512} = \sqrt{-8 \times -8 \times -8} = -8$

iii) $-1331 = \sqrt[3]{-1331} = \sqrt{-11 \times -11 \times -11} = -11$

iv) $\frac{-27}{125} = \frac{-\sqrt{27}}{\sqrt{125}} = \frac{-\sqrt{3 \times 3 \times 3}}{\sqrt{5 \times 5 \times 5}} = \frac{-3}{5}$

v) $= \frac{-\sqrt{3 \times 3 \times 3}}{\sqrt{5 \times 5 \times 5}} = \frac{-3}{5}$

v) $\frac{-64}{343} = \frac{\sqrt[3]{-64}}{\sqrt[3]{343}} = \frac{\sqrt{-4 \times -4 \times -4}}{\sqrt{7 \times 7 \times 7}} = \frac{-4}{7}$

~~vi) $\frac{-25}{25} = \frac{\sqrt[3]{-25}}{\sqrt[3]{25}} =$~~

vii) $\frac{-512}{343} = \frac{\sqrt[3]{-512}}{\sqrt[3]{343}} = \frac{\sqrt{-8 \times -8 \times -8}}{\sqrt{-7 \times -7 \times -7}} = \frac{-8}{7}$

~~viii) $-2197 = \sqrt[3]{-2197} =$~~

viii) $-2197 = \sqrt{-13 \times -13 \times -13} = \sqrt[3]{-13} = -13$

viiii) $\sqrt[3]{-5832} = \sqrt{-18 \times -18 \times -18} = -18$

ix) $\sqrt[3]{-2744000} = \sqrt{-140 \times -140 \times -140} = -140$

4) i) $\sqrt[3]{\frac{2.744}{1000}} = \sqrt[3]{\frac{2 \times 2 \times 2 \times 7 \times 7 \times 7}{10 \times 10 \times 10}} = \frac{2 \times 7}{10} = \frac{14}{10} = 1.4$

ii) $\sqrt[3]{\frac{9.261}{1000}} = \sqrt[3]{\frac{21 \times 21 \times 21}{10 \times 10 \times 10}} = \frac{21}{10} = 2.1$

4) i) $\sqrt[3]{\frac{2.744}{1000}} = \sqrt[3]{\frac{2\times2\times2\times7\times7\times7}{10\times10\times10}} = \frac{2\times7}{10} = \frac{14}{10} = 1.4$

ii) $\sqrt[3]{\frac{9.261}{1000}} = \sqrt[3]{\frac{21\times21\times21}{10\times10\times10}} = \frac{21}{10} = 2.1$

iii) $\sqrt[3]{\frac{027}{1000000}} = \sqrt[3]{\frac{3\times3\times3}{100\times100\times100}} = \frac{3}{100} = 0.03$

iv) $\sqrt[3]{\frac{-512}{1000}} = \sqrt[3]{\frac{-8\times8\times8}{10\times10\times10}} = -\frac{8}{10} = -0.8$

v) $\sqrt[3]{\frac{-15625}{1000}} = \sqrt[3]{-\frac{25\times25\times25}{10\times10\times10}} = -\frac{25}{10} = -2.5$

vi) $\sqrt[3]{-125\times1000} = \sqrt[3]{-5\times5\times5\times10\times10\times10} = -5\times10 = -50$

5) 26244

$= (2\times2)\times(3\times3\times3)\times(3\times3\times3)\times(3\times3)$

$= 2^2 \times 3^3 \times 3^3 \times 3^2 = 2^2 \times 3^2 = 4 * 9 = 36$

$\therefore$ 26244 must be divided by 36.

6) $30375 = 3 \times 3 \times (3 \times 3 \times 3) \times (5 \times 5 \times 5)$

$= 3^2 \times 3^3 \times 5^3 = 3^2 = 83$

$\therefore$ 30375 must be multiplied by 3

3	30375
3	10125
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

7) i) $\sqrt[3]{700 \times 2 \times 49 \times 5}$

$= \sqrt[3]{2 \times 2 \times 5 \times 5 \times 7 \times 2 \times 7 \times 7 \times 5}$

$= \sqrt[3]{(2 \times 2 \times 2) \times (5 \times 5 \times 5) \times (7 \times 7 \times 7)}$

$= \sqrt{70 \times 70 \times 70} = 70$

7) ii) $\sqrt[3]{700 \times 2 \times 49 \times 5}$

$= 2 \times 2 \times 5 \times 5 \times 7 \times 2 \times 7 \times 7 \times 5$

$= (2 \times 2 \times 2) \times (5 \times 5 \times 5) \times (7 \times 7 \times 7)$

$= 2 \times 5 \times 7 = 70$

iii) $\sqrt[3]{-216 \times 1728}$

$= -(6 \times 6 \times 6) \times (12 \times 12 \times 12)$

$= -(12 \times 6) = -72$

$= 2\times2\times5\times5\times7\times2\times7\times7\times5$

$= (2\times2\times2)\times(5\times5\times5)\times(7\times7\times7)$

$= 2\times5\times7 = 70$

iii) $\sqrt[3]{-216\times1728}$

$= -(6\times6\times6)\times(12\times12\times12)$

$= -(12\times6) = -72$

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

$= (-4)\times(-4)\times(-4)\times(-5)\times(-5)\times(-5) = (-5)\times(-4) = 20$

iv) $\sqrt[3]{-\frac{27}{343}} = \sqrt{-\frac{3\times3\times3}{7\times7\times7}} = -\frac{3}{7}$

v) $\sqrt[3]{\frac{729}{-1331}} = \sqrt{-\left(\frac{9\times9\times9}{11\times11\times11}\right)} = -\frac{9}{11}$

vi) $\sqrt[3]{\frac{250047}{1000}} = \sqrt{\frac{63\times63\times63}{10\times10\times10}} = \frac{63}{10} = 6.3$

vii) $\sqrt[3]{-175616} = \sqrt{-(56\times56\times56} = -56$