Section 1.2a – Practice Questions

Emerging Level Questions

1. Find the square root of the perfect squares without a calculator

a) $\sqrt{100}$

100
10 10

Two identical factors so

$\sqrt{100} = 10$

b) $\sqrt{441}$

441
3 147
3 49
7 7

G_1: 3·7 21
G_2: 3·7 21

Two identical factors so

$\sqrt{441} = 21$

c) $\sqrt{225}$

225
5 45
5 9
3 3

G_1: 5·3 15
G_2: 5·3 15

Two identical factors so

$\sqrt{225} = 15$

d) $\sqrt{361}$

361
19 19

Two identical factors so

$\sqrt{361} = 19$

e) $\sqrt{529}$

529
23 23

Two identical factors so

$\sqrt{529} = 23$

f) $\sqrt{2\,890\,000}$

2890 000
28900 100
289 100
17 17

Two identical factors so

$\sqrt{2890\,000} = 1700$

2. Find the cube root of the perfect cubes without a calculator

a) $\sqrt[3]{27}$

Three identical factors so

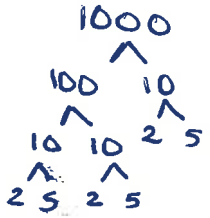
$\sqrt[3]{27} = 3$

b) $\sqrt[3]{1000}$

G_1 $2 \cdot 5$ 10

G_2 $2 \cdot 5$ 10

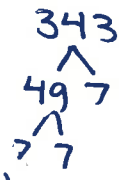
G_3 $2 \cdot 5$ 10



Three identical factors so

$\sqrt[3]{1000} = 10$

c) $\sqrt[3]{343}$



Three identical factors so

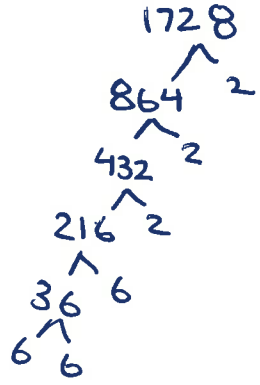
$\sqrt[3]{343} = 7$

d) $\sqrt[3]{1728}$

G_1 $2 \cdot 6$ 12

G_2 $2 \cdot 6$ 12

G_3 $2 \cdot 6$ 12



Three identical factors so

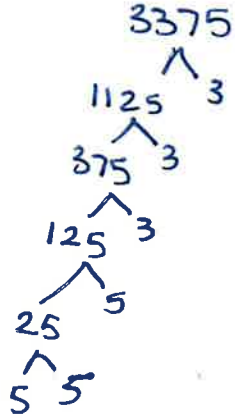
$\sqrt[3]{1728} = 12$

e) $\sqrt[3]{3375}$

G_1 $3 \cdot 5$ 15

G_2 $3 \cdot 5$ 15

G_3 $3 \cdot 5$ 15

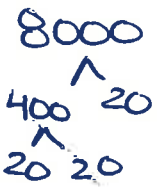


Three identical factors so

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

f) $\sqrt[3]{8000}$

Three identical factors so



$\sqrt[3]{8000} = 20$

PROFICIENT LEVEL QUESTIONS

3. Find the perfect square root, if it exists, without a calculator

a) 25

25
5 5

Two identical factors so

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

b) 29 ← prime number

DNE

c) 80

80
40 2
20 2
2 5

$2 \cdot 2 \cdot 2 \cdot 5$

NO two identical factors so

DNE

d) 81

81
9 9

Two identical factors so

$\sqrt{81} = 9$

e) 169

169
13 13

Two identical factors so

$\sqrt{169} = 13$

f) 99

99
33 3
11 3

$3 \cdot 3 \cdot 11$

NO two identical factors so

DNE

g) 1600

G_1 $10 \cdot 4$ 40

G_2 $10 \cdot 4$ 40

Two identical factors so

$\sqrt{1600} = 40$

1600
160 10
16 10
4 4

h) 900

G_1 $10 \cdot 3$ 30

G_2 $10 \cdot 3$ 30

Two identical factors so

$\sqrt{900} = 30$

900
90 10
9 10
3 3

i) $\frac{81}{400}$

Top: 9
Bottom: 20

Two identical factors on both top + bottom so

$\sqrt{\frac{81}{400}} = \frac{9}{20}$

81 → 9 9

400 → 100 4 → 10 10 2 2

j) $\frac{8}{18}$

$\frac{2 \cdot 2 \cdot 2}{3 \cdot 3 \cdot 2}$

Two identical factors on both top + bottom so

$\sqrt{\frac{8}{18}} \rightarrow \frac{4}{9} = \frac{2}{3}$

8 → 4 2 → 2 2

18 → 9 2 → 3 3

4. Find the perfect cube root, if it exists, without a calculator

a) 8

Three identical factors so

$\sqrt[3]{8} = 2$

8 → 4 2 → 2 2

b) 9

Only two factors so

DNE

9 → 3 3

c) 64

Three identical factors so

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

64 → 16 4 → 4 4

d) 81

Not three identical factors so

$\sqrt[3]{81} \rightarrow$ DNE

81 → 27 3 → 9 3 → 3 3

e) 100

Only two factors so

DNE

100 → 10 10

f) 216

Three identical factors so

$\sqrt[3]{216} = 6$

216 → 36 6 → 6 6

g) 1000

Three identical factors so

$\sqrt[3]{1000} = 10$

1000 → 100 10 → 10 10

h) 144

Only two identical factors so

DNE

144 → 36 4 → 6 6 2 2

i) 625

4 factors so it's a no go!

625
125 5
25 5
5 5

j) 729

Three identical factors so

$\sqrt{729} = 9$

729
81 9
9 9

5. A cube has a volume of $216cm^3$. Determine the length of each side of the cube.

Cube = $cm^{(3)} = l^3$

$l^3 = 216^3$

$l = 6$

216
36 6
6 6

$l = 6$

EXTENDING LEVEL QUESTIONS

6. The area of a rectangle with a length twice as long as the width is $1250m^2$. Determine the length and the width of the rectangle.

Area = $l \cdot w$

$1250 = l \cdot w$ sub in to only have one variable

$\frac{1250}{2} = \frac{l \cdot 2l}{2}$

$625 = l^2$ } find square root

$25 = l$

$2 \cdot l = w$

$2 \cdot 25 = w$

$50 = w$

width = 50m
length = 25m

7. A rectangular solid has a length three times the width and a height twice its width. If the volume of the rectangle solid is $384in^3$, determine the dimensions of the rectangular solid.

Area = $l \cdot w \cdot h = 384in^3$

$l = 3 \cdot w$

$h = 2 \cdot w$

$3w \cdot w \cdot 2w = 384$

$6w^3 = 384$

$w^3 = 64$

$w = 4$

$l = 3 \cdot 4 \rightarrow l = 12$

$h = 2 \cdot 4 \rightarrow h = 8$

$l = 12in$
$h = 8in$
$w = 4in$