Squares and Square Roots Ex 3.6 Q1

Answer :

(i) We know:

$$\sqrt{\frac{441}{961}} = \frac{\sqrt{441}}{\sqrt{961}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\sqrt{441} = \sqrt{(3 \times 3) \times (7 \times 7)} = 3 \times 7 = 21$$

$$\sqrt{961} = \sqrt{31 \times 31} = 31$$

$$\therefore \sqrt{\frac{441}{961}} = \frac{21}{31}$$

(ii) We know:

$$\sqrt{\frac{324}{841}} = \frac{\sqrt{324}}{\sqrt{841}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\sqrt{324} = \sqrt{2 \times 2 \times 3 \times 3 \times 3 \times 3} = 2 \times 3 \times 3 = 18$$

$$\sqrt{841} = \sqrt{29 \times 29} = 29$$

$$\therefore \sqrt{\frac{324}{841}} = \frac{18}{29}$$

(iii) By looking at the book's answer key, the fraction should be $\sqrt{4\frac{29}{49}}$, **not** $\sqrt{4\frac{29}{29}}$.

We know:

$$\sqrt{4\frac{29}{49}} = \sqrt{\frac{225}{49}} = \frac{\sqrt{225}}{\sqrt{49}}$$

$$\sqrt{225} = 15$$

$$\sqrt{49} = 7$$

$$\therefore \sqrt{4\frac{29}{49}} = \frac{15}{7}$$

(iv) We know:

$$\sqrt{2\frac{14}{25}} = \sqrt{\frac{64}{25}} = \frac{\sqrt{64}}{\sqrt{25}} = \frac{8}{5}$$

(v) We know:

$$\sqrt{2\frac{137}{196}} = \sqrt{\frac{529}{196}} = \frac{\sqrt{529}}{\sqrt{196}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\sqrt{529} = \sqrt{23 \times 23} = 23$$

$$\sqrt{196} = \sqrt{2 \times 2 \times 7 \times 7} = 2 \times 7 = 14$$

$$\therefore \sqrt{2\frac{137}{196}} = \frac{23}{14}$$

(vi) We know:

$$\sqrt{23\frac{26}{121}} = \sqrt{\frac{2809}{121}} = \frac{\sqrt{2809}}{\sqrt{121}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

```
           53
     5 | 2809
     5 |   25
   103 |  309
     3 |  309
       | -----
       |  000
```

$$\sqrt{121} = 11$$

$$\therefore \sqrt{23\frac{26}{121}} = \frac{53}{11}$$

(vii) We know:

$$\sqrt{25\frac{544}{729}} = \sqrt{\frac{18769}{729}} = \frac{\sqrt{18769}}{\sqrt{729}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\begin{array}{r|l}
& 137 \\
\hline
1 & 18769 \\
1 & 1 \\
\hline
23 & 87 \\
3 & 69 \\
\hline
267 & 1869 \\
7 & 1869 \\
\hline
& 0
\end{array}$$

$\sqrt{729} = 27$

$\therefore \sqrt{25\frac{544}{729}} = \frac{137}{27}$

(viii) We know:

$$\sqrt{75\frac{46}{49}} = \sqrt{\frac{3721}{49}} = \frac{\sqrt{3721}}{\sqrt{49}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\begin{array}{r|l}
& 61 \\
\hline
6 & 3721 \\
6 & 36 \\
\hline
121 & 121 \\
1 & 121 \\
\hline
& 0
\end{array}$$

$\sqrt{49} = 7$

$\therefore \sqrt{75\frac{46}{49}} = \frac{61}{7}$

(ix) We know:

$$\sqrt{3\frac{942}{2209}} = \sqrt{\frac{7569}{2209}} = \frac{\sqrt{7569}}{\sqrt{2209}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\begin{array}{r|l}
& 87 \\
\hline
8 & 7569 \\
8 & 64 \\
\hline
167 & 1169 \\
7 & 1169 \\
\hline
& 0
\end{array}
\qquad
\begin{array}{r|l}
& 47 \\
\hline
4 & 2209 \\
4 & 16 \\
\hline
87 & 609 \\
7 & 609 \\
\hline
& 0
\end{array}$$

$\therefore \sqrt{3\frac{942}{2209}} = \frac{87}{47}$

(x) We know:

$$\sqrt{3\frac{334}{3025}} = \sqrt{\frac{9409}{3025}} = \frac{\sqrt{9409}}{\sqrt{3025}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\begin{array}{r|l}
& 97 \\
\hline
9 & 9409 \\
9 & 81 \\
\hline
187 & 1309 \\
7 & 1309 \\
\hline
& 0
\end{array}
\qquad
\begin{array}{r|l}
& 55 \\
\hline
5 & 3025 \\
5 & 25 \\
\hline
105 & 525 \\
5 & 525 \\
\hline
& 0
\end{array}$$

$\therefore \sqrt{3\frac{334}{3025}} = \frac{97}{55}$

(xi) We know:

$$\sqrt{21\frac{2797}{3364}} = \sqrt{\frac{73441}{3364}} = \frac{\sqrt{73441}}{\sqrt{3364}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$$\begin{array}{r|l}
& 271 \\
\hline
2 & 73441 \\
2 & 4 \\
\hline
47 & 334 \\
7 & 329 \\
\hline
541 & 541 \\
1 & 541 \\
\hline
& 0
\end{array}
\qquad
\begin{array}{r|l}
& 58 \\
\hline
5 & 3364 \\
5 & 25 \\
\hline
108 & 864 \\
8 & 864 \\
\hline
& 0
\end{array}$$

$\therefore \sqrt{21\frac{2797}{3364}} = \frac{271}{58}$

(xii) We know:

$$\sqrt{38\frac{11}{25}} = \sqrt{\frac{961}{25}} = \frac{\sqrt{961}}{\sqrt{25}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$\sqrt{961} = 31$

$\sqrt{25} = 5$

$\therefore \sqrt{38\frac{11}{25}} = \frac{31}{5}$

(xiii) We know:

$$\sqrt{23 \frac{394}{729}} = \sqrt{\frac{17161}{729}} = \frac{\sqrt{17161}}{\sqrt{729}}$$

Now, let us compute the square roots of the numerator and the denominator separately.

```
          131
      1 | 17161
      1 | 1
     23 | 71
      3 | 69
    261 | 261
      1 | 261
        |   0
```

$\sqrt{729} = 27$

$\therefore \sqrt{23 \frac{394}{729}} = \frac{131}{27} = 4 \frac{23}{27}$

(xiv) We know:

$$\sqrt{21 \frac{51}{169}} = \sqrt{\frac{3600}{169}} = \frac{\sqrt{3600}}{169}$$

Now, let us compute the square roots of the numerator and the denominator separately.

$\sqrt{3600} = \sqrt{60 \times 60} = 60$

$\sqrt{169} = \sqrt{13 \times 13} = 13$

$\therefore \sqrt{21 \frac{51}{169}} = \frac{60}{13} = 4 \frac{8}{13}$

(xv) We know:

$$\sqrt{10 \frac{151}{225}} = \sqrt{\frac{2401}{225}} = \frac{\sqrt{2401}}{\sqrt{225}}$$

Now let us compute the square roots of the numerator and the denominator separately.

$\sqrt{2401} = \sqrt{7 \times 7 \times 7 \times 7} = 7 \times 7 = 49$

$\sqrt{225} = \sqrt{3 \times 3 \times 5 \times 5} = 3 \times 5 = 15$

$\therefore \sqrt{10 \frac{151}{225}} = \frac{49}{15} = 3 \frac{4}{15}$

********** END *********