

Unit 3 Review Answers

(1)

1. $\frac{144}{2^4 \cdot 3^2}$ $\frac{600}{2^3 \cdot 3 \cdot 5^2}$

2. a) 2 b) 12

3. a) 60 b) 144

4. LCM problem

$$\begin{array}{c} 8 \\ \diagup \quad \diagdown \\ 2 \times 4 \\ \diagup \quad \diagdown \quad \diagup \quad \diagdown \\ 2' \times 2' \times 2' \\ 2^3 \end{array}$$

$$\begin{array}{c} 6 \\ \diagup \quad \diagdown \\ 2 \times 3 \\ 2 \cdot 3 \end{array}$$

$$\text{LCM} = 2^3 \cdot 3$$

= 24 hamburgers
can be made

5. a) $\sqrt{225}$
 $5' \times 45'$
 $5 \times 5 \times 9$
 $(5' \times 5') \times (3' \times 3')$

$$5 \times 3 = \boxed{15}$$

b) $\sqrt{196}$
 $2' \times 98'$
 $2 \times 2 \times 49$
 $(2' \times 2') \times (7' \times 7')$

$$2 \cdot 7 = \boxed{14}$$

c) $\sqrt{1225}$
 $5' \times 245'$
 $5 \times 5 \times 49$
 $(5' \times 5') \times (7' \times 7')$

$$5 \cdot 7 = \boxed{35}$$

6. a) $\sqrt[3]{729}$

$$\begin{aligned} &\sqrt[3]{3 \times 243} \\ &3 \times 3 \times 81 \\ &3 \times 3 \times 9 \times 9 \\ &(3 \times 3 \times 3) \times (3 \times 3 \times 3) \\ &3 \times 3 \end{aligned}$$

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

$$\begin{aligned} &5 \times 675 \\ &5 \times 5 \times 135 \\ &5 \times 5 \times 5 \times 27 \\ &5 \times 5 \times 5 \times 3 \times 9 \\ &(5 \times 5 \times 5) \times (3 \times 3 \times 3) \\ &5 \times 3 \end{aligned}$$

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c) $\sqrt[3]{9261}$

$$\begin{aligned} &3 \times 3087 \\ &3 \times 3 \times 1029 \\ &3 \times 3 \times 3 \times 343 \\ &3 \times 3 \times 3 \times 7 \times 49 \\ &(3 \times 3 \times 3) \times (7 \times 7 \times 7) \\ &3 \times 7 \end{aligned}$$

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7. a) $\sqrt{36} = 6$ Rational

b) $\sqrt[3]{12} =$ Irrational

c) $\sqrt[3]{-8} = -2$ Rational

d) $\sqrt{\frac{81}{4}} = \frac{9}{2} =$ Rational

8. a) $\sqrt{320}$
 $\sqrt{64 \times 5}$
 $8\sqrt{5}$

e) $\sqrt[3]{40}$
 $\sqrt[3]{8 \times 5}$
 $2\sqrt[3]{5}$

b) $\sqrt{735}$
 $\sqrt{49 \times 15}$
 $7\sqrt{15}$

f) $\sqrt[3]{162}$
 $\sqrt[3]{27 \times 6}$
 $3\sqrt[3]{6}$

c) $\sqrt{24}$
 $\sqrt{4 \times 6}$
 $2\sqrt{6}$

g) $\sqrt[3]{189}$
 $\sqrt[3]{27 \times 7}$
 $3\sqrt[3]{7}$

d) $\sqrt{108}$
 $\sqrt{36 \times 3}$
 $6\sqrt{3}$

h) $\sqrt[3]{576}$
 $\sqrt[3]{64 \times 9}$
 $4\sqrt[3]{9}$

9. a) $3\sqrt{11}$

$\sqrt{9 \times 11}$
 $\sqrt{99}$

b) $2\sqrt{13}$

$\sqrt{4 \times 13}$
 $\sqrt{52}$

~~a)~~

c) $3\sqrt[3]{4}$

$\sqrt[3]{3 \times 3 \times 3 \times 4}$
 $\sqrt[3]{36}$

d) $2\sqrt[3]{15}$

$\sqrt[3]{2 \times 2 \times 2 \times 15}$
 $\sqrt[3]{120}$

10. a) $1000^{1/3}$

$\sqrt[3]{1000}$
10

d) $(-8)^{1/3}$

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

b) $0.25^{1/2}$

$\sqrt{0.25}$
0.5

e) $(\frac{16}{81})^{1/4}$

$\sqrt[4]{\frac{16}{81}}$
 $\frac{2}{3}$

c) $0.01^{3/2}$

$(\sqrt{0.01})^3$
 $(0.1)^3$
0.001

f) $(-27)^{4/3}$

$(\sqrt[3]{-27})^4$
 $(-3)^4$
81

11. a) $(\sqrt[5]{26})^2$

b) $(\sqrt{5})'$

12. a) $\sqrt{6^5}$

$6^{5/2}$

b) ~~WVWVWV~~ $(\sqrt[4]{19})^3$

$19^{3/4}$

13. $b = 0.01 \text{ m}^{2/3}$

a) $b = 0.01(512)^{2/3}$
 $= 0.01(64)$
 $= 0.64 \text{ kg}$

b) $b = 0.01(5)^{2/3}$
 $b = 0.01(2.92)$
 $= 0.029 \text{ kg}$

14. a) 7^{-2}

$\frac{1}{7^2}$

$\frac{1}{49}$

c) $36^{-3/2}$

$\frac{1}{36^{3/2}}$

$\frac{1}{(\sqrt{36})^3}$

$\frac{1}{6^3}$
 $\frac{1}{216}$

d) $(\frac{10}{3})^{-3}$

$(\frac{3}{10})^3$

$\frac{3^3}{10^3}$

$\frac{27}{1000}$

b) $16^{-5/4}$

$\frac{1}{16^{5/4}}$

$\frac{1}{(\sqrt[4]{16})^5}$

$\frac{1}{2^5}$
 $\frac{1}{32}$

e) $\left(\frac{25}{36}\right)^{1/2}$

$$\sqrt{\frac{25}{36}}$$

$$\left(\frac{5}{6}\right)$$

f) $(-27)^{-1/3}$

$$\frac{1}{(-27)^{1/3}}$$

$$\frac{1}{\sqrt[3]{-27}}$$

$$\left(\frac{1}{-3}\right)$$

15. a) $\frac{9^{5/4} \cdot 9^{1/4}}{9^{3/4}} = \frac{9^{6/4}}{9^{3/4}} = 9^{3/4}$

b) $m^4 n^{-2} \cdot m^2 n^3 = m^4 m^2 n^{-2} n^3 = m^6 n$

c) $\frac{6x^4 y^{-3}}{14xy^2} = \frac{3x^{4-1} y^{-3-2}}{7} = \frac{3x^3 y^{-5}}{7} = \left(\frac{3x^3}{7y^5}\right)$

d) $\left(\frac{50x^2 y^4}{2x^4 y^7}\right)^{1/2} = \left(25x^{2-4} y^{4-7}\right)^{1/2}$
 $= \left(25x^{-2} y^{-3}\right)^{1/2}$
 $= 25^{1/2} x^{-2/2} y^{-3/2}$

$$\left(\frac{5}{xy^{3/2}}\right)$$

$$(F) (x^3 y^{-3/2})(x^{-1} y^{1/2})$$

$$x^{3-1} y^{-3/2+1/2}$$

$$x^2 y^{-2}$$

$$\frac{x^2}{y^2}$$