Key

Chapter 4 Review

b 1. Which is the simplest form of $-6\sqrt{3}-4\sqrt{3}-7\sqrt{3}$?

a. $17\sqrt{9}$
b. $-17\sqrt{3}$
c. $-5\sqrt{3}$
d. $17\sqrt{27}$

$(-6-4-7)\sqrt{3}$
$= -17\sqrt{3}$

c 2. Which is the simplest form of $\sqrt{72}+\sqrt{32}+\sqrt{8}$?

a. $12\sqrt{8}$
b. $6\sqrt{8}$
c. $12\sqrt{2}$
d. $8\sqrt{2}$

$\sqrt{36\cdot 2}+\sqrt{16\cdot 2}+\sqrt{4\cdot 2}$
$= 6\sqrt{2}+4\sqrt{2}+2\sqrt{2}$
$= 12\sqrt{2}$

d 3. Which expression is the simplest form of $\sqrt{3}\cdot\sqrt{21}$?

a. $\sqrt{3}\cdot 7\sqrt{3}$
b. 7.9
c. $\sqrt{63}$
d. $3\sqrt{7}$

$= \sqrt{63}$
$= \sqrt{9\times 7}$
$= 3\sqrt{7}$

d 4. Simplify: $\sqrt{12x^3}$

a. $x\sqrt{12x}$
b. $4x\sqrt{3x}$
c. $2\sqrt{3x}$
d. $2x\sqrt{3x}$

$\sqrt{12}\ \sqrt{x^3}$
$= 2\sqrt{3}\ x\sqrt{x}$
$= 2x\sqrt{3x}$

d 5. Which expression is the rationalized form of $\frac{-\sqrt{2}}{3\sqrt{54}}$?

a. $\frac{-27}{\sqrt{3}}$
b. $\frac{-1}{9\sqrt{3}}$
c. $\frac{-\sqrt{6}}{54}$
d. $\frac{-\sqrt{3}}{27}$

$\frac{-1}{3\sqrt{27}} = \frac{-1}{9\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}$
$= \frac{-\sqrt{3}}{27}$

d

6. Which expression is the rationalized form of $\frac{\sqrt{x^8}}{\sqrt{x^3}}$ in simplest form?

a. $x\sqrt{x}$
b. $\sqrt{x^5}$
c. $x^4\sqrt{x}$
d. $x^2\sqrt{x}$

$\sqrt{x^{8-3}} = \sqrt{x^5}$

$= x^2\sqrt{x}$

b

7. Which restrictions apply to the variable in $\sqrt{15x^3}$?

a. $x > 0, x \in R$
b. $x \geq 0, x \in R$
c. $x \in R$
d. $x \leq 0, x \in R$

a

8. Which restrictions apply to the variable in $\frac{-2\sqrt{x^2}}{11\sqrt{x^3}}$?

a. $x > 0, x \in R$
b. $x \geq 0, x \in R$
c. $x \in R$
d. $x \leq 0, x \in R$

9. Express as a mixed radical in simplest form.

a) $\sqrt{12}$ b) $3\sqrt{108}$ c) $-4\sqrt[3]{81}$ a) $2\sqrt{3}$ b) $18\sqrt{3}$ c) $-12\sqrt{3}$

10. Express as an entire radical.

a) $-2\sqrt[3]{21}$ b) $-2\sqrt[3]{10}$ c) $3\sqrt{8}$

$-\sqrt[3]{168}$ $-\sqrt[3]{80}$ $\sqrt{72}$

11. Perform the indicated operation. (12 marks)

(A) $8\sqrt{20} - 2\sqrt{45} - 3\sqrt{80}$

(B) $(2\sqrt{6} - 3\sqrt{6})^2$

(C) $\frac{2+\sqrt{8}}{\sqrt{3}}$

(D) $-2\sqrt{6}(\sqrt{8} + 3\sqrt{12})$

a) $8\sqrt{4\cdot5} - 2\sqrt{9\cdot5} - 3\sqrt{16\cdot5}$

$= 16\sqrt{5} - 6\sqrt{5} - 12\sqrt{5}$

$= -2\sqrt{5}$

b) $(2\sqrt{6} - 3\sqrt{6})(2\sqrt{6} - 3\sqrt{6})$

$= 4\sqrt{36} - 6\sqrt{36} - 6\sqrt{36} + 9\sqrt{36}$

$= 4\cdot6 - 6\cdot6 - 6\cdot6 + 9\cdot6$

$= 24 - 36 - 36 + 54$

$= 6$

12. Perform the indicated operation and **state the restrictions**.

(A) $\frac{-48\sqrt{y^7}}{6\sqrt{y^3}}$

$-8\sqrt{y^4}$

$= -8y^2$

restriction:

$y > 0$

(B) $\left(\frac{6+\sqrt{x^3}}{\sqrt{x}}\right)\cdot\frac{\sqrt{x}}{\sqrt{x}} = \frac{6\sqrt{x}+\sqrt{x^4}}{\sqrt{x^2}}$

restriction:

$y > 0$

$= \frac{6\sqrt{x}+x^2}{x}$

(C) $4\sqrt{x}(5\sqrt{x^2} - 3\sqrt{x^3})$

$= 20\sqrt{x^3} - 12\sqrt{x^4}$

$= 20x\sqrt{x} - 12x^2$

restriction:

$y \geq 0$

(D) $5\sqrt{y}(-3\sqrt{12y^4})$

$= -15\sqrt{12y^5}$

$= -15 \cdot 2y^2\sqrt{3y}$

$= -30y^2\sqrt{3y}$

restriction:

$y \geq 0$

13. State the restrictions, solve and check the following:

a) $\sqrt{2x+4} = 8$

b) $6\sqrt{2x} = 12$

c) $\sqrt[3]{x-20} + 5 = 2.$

d) $\frac{1}{2}\sqrt{5x-2} = 4$

e) $5\sqrt{3x} + 1 = 7$

a) $2x+4 = 64$

$2x = 60$

$x = 36$

check:

$\sqrt{2(36)+4} \stackrel{?}{=} 8$

$\sqrt{64} \stackrel{\checkmark}{=} 8$

b) $6\sqrt{2x} = 12$

$\sqrt{2x} = 2$

$2x = 4$

$x = 2$

check: $6\sqrt{2(2)} \stackrel{?}{=} 12$

$6 \cdot 2 \stackrel{\checkmark}{=} 12$

c) $\sqrt[3]{x-20} = -3$

$x - 20 = -27$

$x = -7$

check

$\sqrt[3]{(-7)-20} + 5 \stackrel{?}{=} 2$

$\sqrt[3]{-27} + 5 \stackrel{?}{=} 2$

$-3 + 5 \stackrel{\checkmark}{=} 2$

d) $\sqrt{5x-2} = 8$

$5x - 2 = 64$

$5x = 66$

$x = 66/5$

e) $5\sqrt{3x} + 1 = 7$

$\sqrt{3x} = \frac{6}{5}$

$3x = \frac{36}{25}$

$75x = 36$

$x = \frac{36}{75}$