

N.RN.A.2: Radicals and Rational Exponents 3

- 1 The expression $\frac{1}{3}\sqrt{6}(3m\sqrt{2} - k\sqrt{3})$ is equivalent to

- 1) $2m\sqrt{3} - k\sqrt{2}$
- 2) $2m\sqrt{3} - 3k\sqrt{2}$
- 3) $2m - k\sqrt{2}$
- 4) $12m - k\sqrt{6}$

- 2 The product of $(3 + \sqrt{5})$ and $(3 - \sqrt{5})$ is

- 1) $4 - 6\sqrt{5}$
- 2) $14 - 6\sqrt{5}$
- 3) 14
- 4) 4

- 3 The expression $(2 - 3\sqrt{x})^2$ is equivalent to

- 1) $4 - 9x$
- 2) $4 - 3x$
- 3) $4 - 12\sqrt{x} + 9x$
- 4) $4 - 12\sqrt{x} + 6x$

- 4 The legs of a right triangle are represented by $x + \sqrt{2}$ and $x - \sqrt{2}$. The length of the hypotenuse of the right triangle is represented by

- 1) $\sqrt{2x^2 + 4}$
- 2) $2x^2 + 4$
- 3) $x\sqrt{2} + 2$
- 4) $\sqrt{x^2 - 2}$

- 5 The expression $\sqrt[3]{64a^{16}}$ is equivalent to

- 1) $8a^4$
- 2) $8a^8$
- 3) $4a^5\sqrt[3]{a}$
- 4) $4a\sqrt[3]{a^5}$

- 6 The expression $\sqrt[3]{27a^3} \cdot \sqrt[4]{16b^8}$ is equivalent to

- 1) $6ab^2$
- 2) $6ab^4$
- 3) $12ab^2$
- 4) $12ab^4$

- 7 The product of $\sqrt[3]{4m^2}$ and $\sqrt[3]{10m}$ expressed in simplest radical form is

- 1) $\sqrt[3]{40m^3}$
- 2) $2\sqrt[3]{5m^3}$
- 3) $m\sqrt[3]{40}$
- 4) $2m\sqrt[3]{5}$

- 8 The expression $\left(\sqrt[3]{27x^2}\right)\left(\sqrt[3]{16x^4}\right)$ is equivalent to

- 1) $12x^2\sqrt[3]{2}$
- 2) $12x^3\sqrt{2x}$
- 3) $6x^3\sqrt{2x^2}$
- 4) $6x^2\sqrt[3]{2}$

- 9 What is the product of $\sqrt[3]{4a^2b^4}$ and $\sqrt[3]{16a^3b^2}$?

- 1) $4ab^2\sqrt[3]{a^2}$
- 2) $4a^2b^3\sqrt[3]{a}$
- 3) $8ab^2\sqrt[3]{a^2}$
- 4) $8a^2b^3\sqrt[3]{a}$

- 10 The expression $4ab\sqrt{2b} - 3a\sqrt{18b^3} + 7ab\sqrt{6b}$ is equivalent to

- 1) $2ab\sqrt{6b}$
- 2) $16ab\sqrt{2b}$
- 3) $-5ab + 7ab\sqrt{6b}$
- 4) $-5ab\sqrt{2b} + 7ab\sqrt{6b}$

- 11 The sum of $\sqrt[3]{6a^4b^2}$ and $\sqrt[3]{162a^4b^2}$, expressed in simplest radical form, is

- 1) $\sqrt[6]{168a^8b^4}$
- 2) $2a^2b^3\sqrt{21a^2b}$
- 3) $4a^3\sqrt{6ab^2}$
- 4) $10a^2b^3\sqrt{8}$

- 12 What is the value of $4x^{\frac{1}{2}} + x^0 + x^{-\frac{1}{4}}$ when $x = 16$?

- 1) $7\frac{1}{2}$
- 2) $9\frac{1}{2}$
- 3) $16\frac{1}{2}$
- 4) $17\frac{1}{2}$

- 13 The expression $9^{\frac{3}{2}} \bullet 27^{\frac{1}{2}}$ is equivalent to

- 1) 3^2
- 2) $3^{\frac{9}{2}}$
- 3) 243^2
- 4) $243^{\frac{3}{4}}$

Regents Exam Questions

N.RN.A.2: Radicals and Rational Expressions 3

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- 14 The expression $x^{-\frac{2}{5}}$ is equivalent to

- 1) $-\sqrt[2]{x^5}$ 2) $-\sqrt[5]{x^2}$ 3) $\frac{1}{\sqrt[2]{x^5}}$ 4) $\frac{1}{\sqrt[5]{x^2}}$

- 15 Which expression is equivalent to $(9x^2y^6)^{-\frac{1}{2}}$?

- 1) $\frac{1}{3xy^3}$ 2) $3xy^3$ 3) $\frac{3}{xy^3}$ 4) $\frac{xy^3}{3}$

- 16 The expression $\left(x^{\frac{1}{2}}y^{-\frac{2}{3}}\right)^{-6}$ is equivalent to

- 1) $\frac{y^4}{x^3}$ 2) $\frac{x^3}{y^4}$ 3) $\frac{1}{x^3y^4}$ 4) x^3y^4

- 17 When simplified, the expression $\left(\frac{w^{-5}}{w^{-9}}\right)^{\frac{1}{2}}$ is

equivalent to

- 1) w^{-7} 2) w^2 3) w^7 4) w^{14}

- 18 The expression $(x^2 - 1)^{-\frac{2}{3}}$ is equivalent to

- 1) $\sqrt[3]{(x^2 - 1)^2}$ 2) $\frac{1}{\sqrt[3]{(x^2 - 1)^2}}$ 3) $\sqrt{(x^2 - 1)^3}$
4) $\frac{1}{\sqrt{(x^2 - 1)^3}}$

- 19 The expression $\sqrt[3]{27a^{-6}b^3c^2}$ is equivalent to

- 1) $\frac{3bc^{\frac{2}{3}}}{a^2}$ 2) $\frac{3b^9c^6}{a^{18}}$ 3) $\frac{3b^6c^5}{a^3}$ 4) $\frac{3b^3\sqrt[3]{3c^2}}{a^2}$

- 20 The expression $\sqrt[4]{81x^2y^5}$ is equivalent to

- 1) $3x^{\frac{1}{2}}y^{\frac{5}{4}}$ 2) $3x^{\frac{1}{2}}y^{\frac{4}{5}}$ 3) $9xy^{\frac{5}{2}}$ 4) $9xy^{\frac{2}{5}}$

- 21 The expression $\sqrt[4]{16x^2y^7}$ is equivalent to

- 1) $2x^{\frac{1}{2}}y^{\frac{7}{4}}$ 2) $2x^8y^{28}$ 3) $4x^{\frac{1}{2}}y^{\frac{7}{4}}$ 4) $4x^8y^{28}$

- 22 Determine the exact value of $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$ as a fraction in simplest form.

- 23 Express $\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}}$ in simplest radical form.

- 24 Express in simplest form: $\sqrt[3]{\frac{a^6b^9}{-64}}$

- 25 Express $5\sqrt[5]{3x^3} - 2\sqrt[2]{27x^3}$ in simplest radical form.

N.RN.A.2: Radicals and Rational Exponents 3**Answer Section**

1 ANS: 1

$$\frac{1}{3}\sqrt{6}\left(3m\sqrt{2} - k\sqrt{3}\right) = m\sqrt{12} - \frac{k}{3}\sqrt{18} = 2m\sqrt{3} - k\sqrt{2}$$

REF: 011710a2

2 ANS: 4

$$(3 + \sqrt{5})(3 - \sqrt{5}) = 9 - \sqrt{25} = 4$$

REF: 081001a2

3 ANS: 3

REF: 061407a2

4 ANS: 1

$$c = \sqrt{\left(x + \sqrt{2}\right)^2 + \left(x - \sqrt{2}\right)^2} = \sqrt{x^2 + 2\sqrt{2}x + 2 + x^2 - 2\sqrt{2}x + 2} = \sqrt{2x^2 + 4}$$

REF: 011626a2

5 ANS: 3

$$\sqrt[3]{4^3 a^{15}} a = 4a^5 \sqrt[3]{a}$$

REF: 061204a2

6 ANS: 1

$$\sqrt[3]{27a^3} \cdot \sqrt[4]{16b^8} = 3a \cdot 2b^2 = 6ab^2$$

REF: 061504a2

7 ANS: 4

$$\sqrt[3]{4m^2} \cdot \sqrt[3]{10m} = \sqrt[3]{40m^3} = \sqrt[3]{8 \cdot 5m^3} = 2m\sqrt[3]{5}$$

REF: 081627a2

8 ANS: 4

$$\left(\sqrt[3]{27x^2}\right)\left(\sqrt[3]{16x^4}\right) = \sqrt[3]{3^3 \cdot 2^4 \cdot x^6} = 3 \cdot 2 \cdot x^2 \sqrt[3]{2} = 6x^2 \sqrt[3]{2}$$

REF: 011421a2

9 ANS: 1

$$\sqrt[3]{64a^5b^6} = \sqrt[3]{4^3 a^3 a^2 b^6} = 4ab^2 \sqrt[3]{a^2}$$

REF: 011516a2

10 ANS: 4

$$4ab\sqrt{2b} - 3a\sqrt{9b^2}\sqrt{2b} + 7ab\sqrt{6b} = 4ab\sqrt{2b} - 9ab\sqrt{2b} + 7ab\sqrt{6b} = -5ab\sqrt{2b} + 7ab\sqrt{6b}$$

REF: fall0918a2

11 ANS: 3

$$\begin{aligned} & \sqrt[3]{6a^4b^2} + \sqrt[3]{(27 \cdot 6)a^4b^2} \\ & a\sqrt[3]{6ab^2} + 3a\sqrt[3]{6ab^2} \\ & 4a\sqrt[3]{6ab^2} \end{aligned}$$

REF: 011319a2

12 ANS: 4

$$\begin{aligned} f(16) &= 4(16)^{\frac{1}{2}} + 16^0 + 16^{-\frac{1}{4}} \\ &= 4(4) + 1 + \frac{1}{2} \\ &= 17\frac{1}{2} \end{aligned}$$

REF: 081503a2

13 ANS: 2

$$9^{\frac{3}{2}} \bullet 27^{\frac{1}{2}} = (3^2)^{\frac{3}{2}} \bullet (3^3)^{\frac{1}{2}} = 3^3 \bullet 3^{\frac{3}{2}} = 3^{\frac{9}{2}}$$

REF: 011707a2

14 ANS: 4

$$x^{-\frac{2}{5}} = \frac{1}{x^{\frac{2}{5}}} = \frac{1}{\sqrt[5]{x^2}}$$

REF: 011118a2

15 ANS: 1 REF: 011306a2

16 ANS: 1

$$\left(x^{\frac{1}{2}} y^{-\frac{2}{3}} \right)^{-6} = x^{-3} y^4 = \frac{y^4}{x^3}$$

REF: 081611a2

17 ANS: 2

$$\left(\frac{w^{-5}}{w^{-9}} \right)^{\frac{1}{2}} = (w^4)^{\frac{1}{2}} = w^2$$

REF: 081011a2

18 ANS: 2 REF: 061011a2

19 ANS: 1

$$\sqrt[3]{27a^{-6}b^3c^2} = 3a^{-2}bc^{\frac{2}{3}} = \frac{3bc^{\frac{2}{3}}}{a^2}$$

REF: 011606a2

20 ANS: 1

$$\sqrt[4]{81x^2y^5} = 81^{\frac{1}{4}}x^{\frac{2}{4}}y^{\frac{5}{4}} = 3x^{\frac{1}{2}}y^{\frac{5}{4}}$$

REF: 081504a2

21 ANS: 1

$$\sqrt[4]{16x^2y^7} = 16^{\frac{1}{4}}x^{\frac{2}{4}}y^{\frac{7}{4}} = 2x^{\frac{1}{2}}y^{\frac{7}{4}}$$

REF: 061107a2

22 ANS:

$$\left(\frac{27}{64}\right)^{-\frac{2}{3}} = \left(\frac{64}{27}\right)^{\frac{2}{3}} = \left(\frac{4}{3}\right)^2 = \frac{16}{9}$$

REF: 011729a2

23 ANS:

$$\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}} = \sqrt{18x^4y^3} = 3x^2y\sqrt{2y}$$

REF: 011133a2

24 ANS:

$$-\frac{a^2b^3}{4}$$

REF: 011231a2

25 ANS:

$$5\sqrt{3x^3} - 2\sqrt{27x^3} = 5\sqrt{x^2}\sqrt{3x} - 2\sqrt{9x^2}\sqrt{3x} = 5x\sqrt{3x} - 6x\sqrt{3x} = -x\sqrt{3x}$$

REF: 061032a2