Name: _____

N.RN.A.2: Radicals and Rational Exponents 1a

1 What is the value of the expression $2x^{-\frac{1}{3}}$ when $x = 8$?

1) 1 2) 2 3) $\frac{1}{2}$ 4) $\frac{1}{4}$

2 If $f(x) = x^{-\frac{1}{3}}$, what is f(64)?

1) $\frac{1}{4}$ 2) -8 3) -4 4) 4

3 The value of $(-64)^{\frac{2}{3}}$ is

1) 16 2) -16 3) $-\frac{1}{16}$ 4) 512

4 The expression $4^{\frac{1}{2}} \cdot 2^3$ is equal to

1) $4^{\frac{3}{2}}$ 2) $8^{\frac{3}{2}}$ 3) 16 4) 4

5 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) $243^{\frac{3}{4}}$

6 The expression $\frac{3^{\frac{1}{3}}}{3^{-\frac{2}{3}}}$ is equivalent to

1) 1 2) $\sqrt{3}$ 3) 3 4) $\frac{1}{\sqrt[3]{3}}$

7 The value of $\left(\frac{3^0}{27^{\frac{2}{3}}}\right)^{-1}$ is

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

8 If $f(x) = x^{-\frac{3}{2}}$, then $f\left(\frac{1}{4}\right)$ is equal to

1) 8 2) -2 3) $-\frac{1}{8}$ 4) -4

9 The value of $\left(\frac{8}{27}\right)^{-\frac{2}{3}}$ is

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

10 Which number is the largest?

1) $\left(\frac{1}{4}\right)^{-1}$ 2) $\left(\frac{1}{4}\right)^0$ 3) $\left(\frac{1}{4}\right)^{\frac{1}{2}}$ 4) $\left(\frac{1}{4}\right)^2$

11 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) $17\frac{1}{2}$

12 If $x = 4$, the value of $4x^{\frac{1}{2}} + (x^0 + 3)^{-1}$ is

1) $\frac{11}{28}$ 2) $4\frac{1}{3}$ 3) $8\frac{1}{7}$ 4) $8\frac{1}{4}$

13 If $f(x) = 3x^2 + 3x^{\frac{1}{2}} + 3x$, then $f(-9)$ is equal to

1) $-270 + 9i$ 2) $216 + 9i$ 3) $246\frac{1}{27}$

4) $216\frac{1}{27}$

14 If $\left(a^x\right)^{\frac{2}{3}} = \frac{1}{a^2}$, what is the value of x?

1) 1 2) 2 3) -3 4) -1

N.RN.A.2: Radicals and Rational Exponents 1a
Answer Section

1 ANS: 1 REF: 060132siii
2 ANS: 1 REF: 080116siii
3 ANS: 1 REF: 019520siii
4 ANS: 3

$4^{\frac{1}{2}} \cdot 2^3 = \sqrt{4} \cdot 8 = 16$

REF: 080601b
5 ANS: 2

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

REF: 011707a2
6 ANS: 3

$\frac{3^{\frac{1}{3}}}{3^{-\frac{2}{3}}} = 3^{\frac{1}{3}-(-\frac{2}{3})} = 3^1 = 3$

REF: 080218b
7 ANS: 2

$(\frac{3^0}{27^{\frac{2}{3}}})^{-1} = \frac{27^{\frac{2}{3}}}{3^0} = 3^2 = 9$

REF: 010217b
8 ANS: 1

$f(\frac{1}{4}) = (\frac{1}{4})^{-\frac{3}{2}} = 4^{\frac{3}{2}} = 8$

REF: 060602b
9 ANS: 4 REF: 018922siii
10 ANS: 1 REF: 061002b
11 ANS: 4

$f(16) = 4(16)^{\frac{1}{2}} + 16^0 + 16^{-\frac{1}{4}}$

$= 4(4) + 1 + \frac{1}{2}$

$= 17\frac{1}{2}$

REF: 081503a2

12 ANS: 4 REF: 019418siii
13 ANS: 2 REF: 089431siii
14 ANS: 3

$$a^{\frac{2x}{3}} = \frac{1}{a^2}$$
$$a^{\frac{2x}{3}} \cdot a^2 = 1$$
$$a^{\frac{2x}{3}+2} = 1$$
$$a^{\frac{2x}{3}+2} = a^0$$
$$\frac{2x}{3} + 2 = 0$$
$$\frac{2x}{3} = -2$$
$$2x = -6$$
$$x = -3$$

REF: 060516b