

**A2.N.1: Negative and Fractional Exponents 1: Evaluate numerical expressions with negative and/or fractional exponents, without the aid of a calculator**1 What is the value of  $3^{-2}$ ?

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

2 What is the value of  $2^{-3}$ ?

- 1)  $\frac{1}{6}$
- 2)  $\frac{1}{8}$
- 3) -6
- 4) -8

3 What is the value of  $3^0 + 3^{-2}$ ?

- 1) 0
- 2)  $\frac{1}{9}$
- 3)  $1\frac{1}{9}$
- 4) 6

4 If  $f(x) = 4x^0 + (4x)^{-1}$ , what is the value of  $f(4)$ ?

- 1) -12
- 2) 0
- 3)  $1\frac{1}{16}$
- 4)  $4\frac{1}{16}$

5 If  $f(x) = (x^{-x} - x^0 + 2^x)$ , then  $f(3)$  is equal to

- 1)  $8\frac{1}{27}$
- 2)  $7\frac{1}{27}$
- 3) -21
- 4) -22

6 The expression  $\left(\frac{3}{4}\right)^2 \cdot \left(\frac{1}{4}\right)^{-2}$  is equivalent to

- 1)  $\frac{9}{16}$
- 2)  $\frac{9}{256}$
- 3) 3
- 4) 9

7 If  $a = 3$  and  $b = -2$ , what is the value of the expression  $\frac{a^{-2}}{b^{-3}}$ ?

- 1)  $-\frac{9}{8}$
- 2) -1
- 3)  $-\frac{8}{9}$
- 4)  $\frac{8}{9}$

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 The value of  $(-64)^{\frac{2}{3}}$  is
- 16
  - 16
  - $-\frac{1}{16}$
  - 512
- 11 If  $f(x) = x^{-\frac{1}{3}}$ , what is  $f(64)$ ?
- $\frac{1}{4}$
  - 8
  - 4
  - 4
- 12 What is the value of the expression  $2x^{-\frac{1}{3}}$  when  $x = 8$ ?
- 1
  - 2
  - $\frac{1}{2}$
  - $\frac{1}{4}$
- 13 The expression  $4^{\frac{1}{2}} \cdot 2^3$  is equal to
- $4^{\frac{3}{2}}$
  - $8^{\frac{3}{2}}$
  - 16
  - 4
- 14 If  $x = 4$ , the value of  $4x^{\frac{1}{2}} + (x^0 + 3)^{-1}$  is
- $\frac{11}{28}$
  - $4\frac{1}{3}$
  - $8\frac{1}{7}$
  - $8\frac{1}{4}$
- 15 What is the value of  $4x^{\frac{1}{2}} + x^0 + x^{-\frac{1}{4}}$  when  $x = 16$ ?
- $7\frac{1}{2}$
  - $9\frac{1}{2}$
  - $16\frac{1}{2}$
  - $17\frac{1}{2}$
- 16 If  $f(x) = 3x^2 + 3x^{\frac{1}{2}} + 3x$ , then  $f(-9)$  is equal to
- $-270 + 9i$
  - $216 + 9i$
  - $246\frac{1}{27}$
  - $216\frac{1}{27}$
- 17 The value of  $\left(\frac{3^0}{27^{\frac{2}{3}}}\right)^{-1}$  is
- 9
  - 9
  - $-\frac{1}{9}$
  - $\frac{1}{9}$
- 18 The expression  $\frac{3^{\frac{1}{3}}}{3^{-\frac{2}{3}}}$  is equivalent to
- 1
  - $\sqrt{3}$
  - 3
  - $\frac{1}{\sqrt[3]{3}}$

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**Answer Section**

1 ANS: 1 REF: 060020a

2 ANS: 2 REF: 080522a

3 ANS: 3 REF: 010723a

4 ANS: 4 REF: 060406b

5 ANS: 2 REF: 080701b

6 ANS: 4 REF: 080730a

7 ANS: 3

$$\frac{3^{-2}}{(-2)^{-3}} = \frac{\frac{1}{9}}{-\frac{1}{8}} = -\frac{8}{9}$$

REF: 061003a2

8 ANS: 1 REF: 060602b

9 ANS: 4 REF: 018922a

10 ANS: 1 REF: 019520siii

11 ANS: 1 REF: 080116siii

12 ANS: 1 REF: 060132siii

13 ANS: 3 REF: 080601b

14 ANS: 4 REF: 019418siii

15 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

16 ANS: 2 REF: 089431siii

17 ANS: 2 REF: 010217b

18 ANS: 3 REF: 080218b