

A2.N.1: Negative and Fractional Exponents 3: Evaluate numerical expressions with negative and/or fractional exponents, without the aid of a calculator

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

2 If n is a negative integer, then which statement is always true?

1) $6n^{-2} < 4n^{-1}$

2) $\frac{n}{4} > -6n^{-1}$

3) $6n^{-1} < 4n^{-1}$

4) $4n^{-1} > (6n)^{-1}$

3 Evaluate: $-10x^0$

4 If $f(x) = x + x^{-1}$, find the value of $f(4)$.

5 If $f(x) = 4x^{-2} - 2x^0$, find the value of $f(2)$.

6 If a function p is defined by $p(x) = \frac{2x^2 - x^0}{7}$, find the value of $p(-2)$.

7 If $f(a) = a^0 + a^{-2}$, find $f(-2)$.

8 If $f(x) = x^{\frac{2}{3}}$, find $f(-27)$.

9 If $f(x) = 4x^{\frac{1}{2}}$, find $f(4)$.

10 Find the value of $(-8)^{\frac{2}{3}}$.

11 If $g(x) = x^{-\frac{3}{2}}$, find $g(4)$.

12 If $f(x) = x^{-\frac{1}{2}}$, find $f(9)$.

13 If $f(x) = x^{\frac{3}{4}}$, find $f(16)$.

14 If $g(x) = 36^x$, evaluate $g\left(-\frac{1}{2}\right)$.

15 Find the value of $27^{\frac{4}{3}}$.

16 If $g(x) = \left(\frac{1}{64}\right)^x$, find $g\left(-\frac{1}{3}\right)$.

17 If $f(x) = x^{-\frac{3}{2}}$, find $f\left(\frac{16}{9}\right)$.

18 If $f(x) = x^0 + x^{\frac{2}{3}} + x^{-\frac{2}{3}}$, find $f(8)$.

19 Express in *simplest form* the value of $2x^0 + x^{\frac{2}{3}}$ if $x = 27$.

20 Find the value of $2p^0 - p^{\frac{2}{3}}$ if $p = 8$.

21 What is the value of $3a^0 + a^{\frac{1}{2}} + 8a^{-2}$ when $a = 4$?

22 If $f(x) = x^{\frac{1}{2}} + x^{-2}$, what is the value of $f(4)$?

23 If $f(x) = (16x)^0 + x^{\frac{2}{3}}$, find $f(64)$.

24 If $a = 4$, evaluate $a^{\frac{1}{2}} + a^0 + a^{-2}$.

25 Evaluate: $-3x^0 + (8)^{\frac{2}{3}} + \left(\frac{1}{2}\right)^{-2}$

26 If $f(x) = x^0 + x^{\frac{1}{2}} + x^{-1}$, find $f(4)$.

27 Find the value of $5x^0 + x^{-\frac{1}{2}} - x^{\frac{1}{2}}$ when $x = 16$.

28 If $f(x) = x^{-2} + 27^x$, find $f\left(\frac{2}{3}\right)$ in simplest form.

29 If $f(b) = b^0 + b^{-1} + b^{-2}$, find $f(2)$.

30 Find the value of the expression $2x^0 + x^{\frac{1}{3}}$ when $x = 125$.

31 If $10^{3.5551} = 3590$, find the value of $10^{0.5551}$.

32 If $f(x) = \left(x^0 + x^{\frac{1}{2}}\right)^{-2}$, find $f(9)$.

33 Find the value of $(x+2)^0 + (x+1)^{-\frac{2}{3}}$ when $x = 7$.

34 Evaluate the expression $(x+3)^{\frac{1}{2}} + (x-3)^0 + (x+2)^{-\frac{2}{3}}$ when $x = 6$.

35 Find the value of the following expression when $x = 4$, $y = 8$, $a = 3$, $b = 5$:

$$(4x^{\frac{1}{2}} - a^{-1}(y^{\frac{1}{3}} + \sqrt{x+b}))^3$$

36 Find the numeric value of the following expression when $x = 4$, $y = 3$, $m = 1$, $n = 2$:

$$\frac{3x^n}{ny} - 2mx^{-\frac{1}{2}}y^m + 2nx^{-m}y^2$$

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Answer Section

1 ANS: 1 REF: 061002b

2 ANS: 3

$6n^{-1} < 4n^{-1}$. Flip sign when multiplying each side of the inequality by n , since a negative number.

$$\frac{6}{n} < \frac{4}{n}$$

$$6 > 4$$

REF: 061314a2

3 ANS:
-10

REF: 089306siii

4 ANS:
 $\frac{17}{4}$

REF: 018403siii

5 ANS:
-1

REF: 088403siii

6 ANS:
1

REF: 068503siii

7 ANS:
 $1\frac{1}{4}$

REF: 068812siii

8 ANS:
9

REF: 068002siii

9 ANS:
8

REF: 068101siii

10 ANS:
4

REF: 088511siii

11 ANS:

$$\frac{1}{8}$$

REF: 068611siii

12 ANS:

$$\frac{1}{3}$$

REF: 069007siii

13 ANS:

$$8$$

REF: 089004siii

14 ANS:

$$\frac{1}{6}$$

REF: 060010siii

15 ANS:

$$81$$

REF: 010203siii

16 ANS:

$$4$$

REF: 060204siii

17 ANS:

$$\frac{27}{64}$$

REF: 010310siii

18 ANS:

$$5\frac{1}{4}$$

REF: 069711siii

19 ANS:

$$11$$

REF: 018609siii

20 ANS:

$$-2$$

REF: 088614siii

21 ANS:

$$5.5$$

REF: 010407siii

22 ANS:

$$2\frac{1}{16}$$

REF: 089705siii

23 ANS:

$$17$$

REF: 019807siii

24 ANS:

$$3\frac{1}{16}$$

REF: 089810siii

25 ANS:

$$5$$

REF: 069911siii

26 ANS:

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

REF: 089901siii

27 ANS:

$$\frac{5}{4}$$

REF: 010013siii

28 ANS:

$$11\frac{1}{4}$$

REF: 080206siii

29 ANS:

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

REF: 060302siii

30 ANS:

$$7$$

REF: 080306siii

31 ANS:

$$3.59$$

REF: 068614siii

32 ANS:

$$\frac{1}{16}$$

REF: 069416siii

33 ANS:

1.25

REF: 080322b

34 ANS:

4.25

REF: 080921b

35 ANS:

125

REF: 039305al

36 ANS:

14

REF: 019414al