

## Worksheet #8—Basic Arithmetic Fractional Exponent Problems

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Simplify each of the following. Leave no exponents in your final answer.

(1)  $9^{-2}$

(2)  $8^{2/3}$

(3)  $32^{2/5}$

(4)  $27^{-1/3}$

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

(6)  $(-32)^{-3/5}$

(7)  $16^{1/2}$

(8)  $\left(\frac{4}{81}\right)^{3/2}$

(9)  $\left(\frac{2}{3}\right)^2$

(10)  $\left(\frac{4}{9}\right)^{-2}$

(11)  $(-8)^{2/3}$

(12)  $\left(\frac{1}{64}\right)^{-2/3}$

(13)  $5^0$

(14)  $16^{-3/4}$

(15)  $4^{-2}$

(16)  $1^{-2}$

(17)  $-\left(\frac{1}{8}\right)^{-1}$

(18)  $\left(-\left(\frac{1}{8}\right)\right)^{-1}$

(19)  $\left(-\left(\frac{1}{8}\right)\right)^{-2}$

(20)  $\left(\frac{9}{16}\right)^{1/2}$

(21)  $\left(\frac{8}{27}\right)^{-2/3}$

(22)  $4^{-5/2}$

(23)  $144^{1/2}$

(24)  $27^{1/3}$

(25)  $8^{-2}$

(26)  $4^{-3/2}$

(27)  $25^{3/2}$

(28)  $64^{1/6}$

(29)  $100^{-1/2}$

(30)  $64^{1/3}$

(31)  $16^{1/4}$

(32)  $8^{2/3}$

(33)  $4^{-1/2}$

(34)  $64^{2/3}$

(35)  $\left(\frac{1}{9}\right)^{-3/2}$

(36)  $4^{1/2} + 9^{-1/2}$

(37)  $\left(\frac{1}{2}\right)^3$

(38)  $(-8)^{-1/3}$

(39)  $\left(\frac{4}{9}\right)^{3/2}$

(40)  $\left(\frac{2}{3}\right)^{-2}$

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

(42)  $27^{-1/3}$

(43)  $(-9)^{-1}$

(44)  $64^{3/2}$

(45)  $32^{1/5}$

(46)  $(-8)^{-3}$

(47)  $3^{-1} 5^{-2}$

(48)  $64^{1/3}$

(49)  $125^{-2/3}$

(50)  $36^{-3/2}$

(51)  $32^{-2/5}$

(52)  $64^{-1/2}$

(53)  $4^{1/2} 8^{1/3}$

(54)  $\left(\frac{2}{5}\right)^0$

$$(55) 8^{2/6}$$

$$(58) \left(4^{1/3}\right)^{3/2}$$

$$(61) 3\left(\frac{4}{9}\right)^{-3/2}$$

$$(64) \left(\frac{64}{9}\right)^{3/2}$$

$$(67) 5^{3/4} 5^{1/4}$$

$$(70) \left(-\left(\frac{4}{9}\right)\right)^{-2}$$

$$(73) \left(\frac{1}{64}\right)^{-2/3}$$

$$(76) \left(\frac{2}{3}\right)^{-3}$$

$$(79) \left(\frac{7}{11}\right)^{-1}$$

$$(56) 11^{-2}$$

$$(59) 729^{-1/3}$$

$$(62) \left(\frac{8}{125}\right)^{2/3}$$

$$(65) 16^{-1/4}$$

$$(68) 4(8)^{-2/3}$$

$$(71) \left(\left(\frac{2}{3}\right)^{2/3}\right)^6$$

$$(74) 4^{-5/2}$$

$$(77) \left(-\left(\frac{2}{3}\right)\right)^{-3}$$

$$(80) 49^{-1/2}$$

$$(57) 81^{-3/2}$$

$$(60) 3^{-2} + 2^{-3}$$

$$(63) \left(\frac{1}{27}\right)^{-2/3}$$

$$(66) (10^8)^{3/2}$$

$$(69) (-1)^{1/2}$$

$$(72) \left(\frac{216}{729}\right)^{2/3}$$

$$(75) 125^{2/3}$$

$$(78) \left(-\left(\frac{2}{3}\right)\right)^{-2}$$

$$(81) 1000^{-2/3}$$

- Answers: (1)  $\frac{1}{81}$  (2) 4 (3) 4 (4)  $\frac{1}{3}$  (5) 4 (6)  $-\frac{1}{8}$  (7) 4 (8)  $\frac{8}{729}$
- (9)  $\frac{4}{9}$  (10)  $\frac{81}{16}$  (11) 4 (12) 16 (13) 1 (14)  $\frac{1}{8}$  (15)  $\frac{1}{16}$  (16) 1
- (17) -8 (18) -8 (19) 64 (20)  $\frac{3}{4}$  (21)  $\frac{9}{4}$  (22)  $\frac{1}{32}$  (23) 12 (24) 3
- (25)  $\frac{1}{64}$  (26)  $\frac{1}{8}$  (27) 125 (28) 2 (29)  $\frac{1}{10}$  (30) 4 (31) 2 (32) 4
- (33)  $\frac{1}{2}$  (34) 16 (35) 27 (36)  $\frac{7}{3}$  (37)  $\frac{1}{8}$  (38)  $-\frac{1}{2}$  (39)  $\frac{8}{27}$  (40)  $\frac{9}{4}$
- (41)  $\frac{1}{2}$  (42)  $\frac{1}{3}$  (43)  $-\frac{1}{9}$  (44) 512 (45) 2 (46)  $-\frac{1}{512}$  (47)  $\frac{1}{75}$  (48) 4
- (49)  $\frac{1}{25}$  (50)  $\frac{1}{216}$  (51)  $\frac{1}{4}$  (52)  $\frac{1}{8}$  (53) 4 (54) 1 (55) 2 (56)  $\frac{1}{121}$
- (57)  $\frac{1}{729}$  (58) 2 (59)  $\frac{1}{9}$  (60)  $\frac{17}{72}$  (61)  $\frac{81}{8}$  (62)  $\frac{4}{25}$  (63) 9 (64)  $\frac{512}{27}$
- (65)  $\frac{1}{2}$  (66) 1000000000000 (67) 5 (68) 1 (69)  $i$  (70)  $\frac{81}{16}$  (71)  $\frac{16}{81}$
- (72)  $\frac{4}{9}$  (73) 16 (74)  $\frac{1}{32}$  (75) 25 (76)  $\frac{27}{8}$  (77)  $-\frac{27}{8}$  (78)  $\frac{9}{4}$  (79)  $\frac{11}{7}$
- (80)  $\frac{1}{7}$  (81)  $\frac{1}{100}$