N: D: P: 1 2 3 4 5 6

Algebra 2: Topic 5 // **Review Worksheet A** *Powers, Roots, and Radicals*

Directions: Calculators are not allowed. Do not leave negative exponents in your answers.

Simplify each of the following expressions as much as possible.

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

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

3) $49^{-\frac{1}{2}}$

4) $64^{-\frac{1}{3}}$

5) $8^{\frac{4}{3}}$

6) $25^{\frac{3}{2}}$

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

8) $\frac{5^{\frac{2}{3}}}{5^{\frac{1}{4}}}$

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

10) $10^{\frac{4}{5}} \bullet 10^{-\frac{1}{2}}$

11) $\left(3^{\frac{1}{7}} \bullet 3^{\frac{3}{7}}\right)^{7}$

12) $\left(8^{\frac{7}{9}} \bullet 8^{-\frac{2}{9}}\right)^{9}$

13) $\frac{1}{n^{-3}}$

14) $\frac{1}{x^{-4}}$

15) $(-27)^{\frac{2}{3}}$

16) $(-8)^{\frac{2}{3}}$

17) $\left(15^{\frac{1}{2}}\right)^{\frac{3}{4}}$

18) $\left(20^{\frac{2}{3}}\right)^{\frac{3}{8}}$

19) $\sqrt{40}$

20) $5\sqrt{24}$

21) $\sqrt{25x^2}$ (Assume $x \geq 0$)

22) $\sqrt[4]{81x^{20}}$ (Assume $x \geq 0$)

23) $\sqrt[3]{32x^{10}}$

24) $\sqrt[3]{54x^5}$

25) $\frac{6a^4bc^{-3}}{(a^{-2}b^4c)^4}$

26) $\frac{5ab^2c^{-2}}{(a^{-4}bc^3)^3}$

27) $\frac{20x^{-5}}{14y^2} \div \frac{5x^{-2}}{7y^{-3}}$

28) $\frac{12x^2}{9y^{-5}} \div \frac{8x^{-6}}{18y^{-1}}$

29) $\left(-5x^0y^{-4}\right)^2\left(2x^{-3}y^5\right)$

30) $\left(-5x^4y^{-2}\right)^3\left(x^{-3}y^0\right)$

31) $\left(8x^5y^{-3}\right)^{-2}$

32) $\left(3xy^{-4}\right)^{-3}$

33) $\frac{24x^7y^{-3}}{6x^2y^{-2}}$

34) $\frac{30x^2y^{-7}}{20x^4y}$

35) $\frac{8x^5y^{-1}}{3xy^2} \bullet \frac{-6x^2}{x^{-2}y^5}$

36) $\frac{9x^2y^{-5}}{4xy} \bullet \frac{-8x^4}{x^{-4}y^3}$

37) Express $(12)^{\frac{2}{3}}$ in radical form.

38) Express $(3)^{\frac{5}{2}}$ in radical form.

39) If the equation $y = 5^x$ is graphed, which of the following values of x would produce a point furthest from the x-axis?

A) $-\frac{1}{5}$ B) $-\frac{9}{4}$ C) $4\frac{3}{8}$ D) -10

40) If the equation $y = (\frac{1}{2})^x$ is graphed, which of the following values of x would produce a

point furthest from the x-axis?

A) -3.8 B) $-1\frac{1}{4}$ C) $2\frac{3}{8}$ D) 9

41) If the equation $y = 8^x$ is graphed, which of the following values of x would produce a point closest to the x-axis?

A) -5 B) -1 C) 7 D) 14

42) If the equation $y = (\frac{3}{8})^x$ is graphed, which of the following values of x would produce a point closest to the x-axis?

A) -6.7 B) $-2\frac{3}{5}$ C) $\frac{9}{4}$ D) 20

43) Suppose a certain radioactive element decays over time according to the equation $y = A(\frac{1}{3})^{\frac{t}{200}}$, where A = number of grams present initially and t = time in years. If 2700 grams were present initially, how many grams will remain after 400 years?

44) Bacteria in a culture are growing exponentially with time, as shown in the table below.

Bacteria Growth

Day	Bacteria
0	500
1	1000
2	2000

Which of the following equations expresses the number of bacteria, y, present at any time, t?

A) $y = 500 + 2^t$ B) $y = 2^t$ C) $y = (500) \bullet (2)^t$ D) $y = (1000) \bullet (2)^t$

45) Suppose the population, P, of a town grew according to the equation $P = A(4)^{\frac{t}{7}}$, where A = number of people present initially and t = time in years. If the population of the town is 6400 after 21 years, how many people were initially present?

Sketch the graph of each of the following functions:

46) $y = 3(5)^x$

47) $f(x) = (\frac{1}{7})^x$