Honors Pre-Calculus - Unit 5 Name KEY

Unit 5 Review

Date_____

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

1) $\left(\dfrac{m^{\frac{7}{4}}n^{-1}p^{2}\cdot pm^{2}n^{\frac{1}{2}}}{n^{\frac{4}{3}}}\right)^{2}$

$\left(\dfrac{m^{\frac{15}{4}}n^{-\frac{1}{2}}p^{3}}{n^{4/3}}\right)^{2}=\left(\dfrac{m^{\frac{15}{4}}p^{3}}{n^{11/6}}\right)^{2}=\dfrac{m^{\frac{30}{4}}p^{6}}{n^{22/6}}=\dfrac{n^{\frac{2}{6}}}{n^{\frac{22}{6}}}$

$=\dfrac{m^{\frac{30}{4}}p^{6}n^{\frac{2}{6}}}{n^{\frac{24}{6}}}=\boxed{\dfrac{m^{\frac{15}{2}}p^{6}n^{\frac{1}{3}}}{n^{4}}}$

2) $\dfrac{\left(x^{-\frac{5}{4}}y^{\frac{1}{3}}z^{-\frac{3}{2}}\right)^{-\frac{3}{2}}}{x^{\frac{1}{2}}y^{\frac{1}{2}}z^{\frac{1}{2}}\cdot y^{-\frac{1}{4}}z^{\frac{7}{4}}}=\dfrac{x^{\frac{15}{8}}y^{-\frac{1}{2}}z^{\frac{9}{4}}}{x^{\frac{1}{2}}y^{\frac{1}{4}}z^{\frac{7}{4}}}$

$=\dfrac{x^{\frac{11}{8}}}{y^{9/4}}\cdot\dfrac{y^{3/4}}{y^{3/4}}=\dfrac{x^{\frac{11}{8}}y^{\frac{3}{4}}}{y^{\frac{12}{4}}}=\boxed{\dfrac{x^{\frac{11}{8}}y^{\frac{3}{4}}}{y^{3}}}$

3) $\left(\dfrac{x^{-2}z^{-\frac{5}{4}}}{x^{\frac{7}{4}}y^{2}\cdot x^{-1}y^{\frac{3}{2}}}\right)^{-\frac{7}{4}}=\left(\dfrac{x^{-2}z^{-\frac{5}{4}}}{x^{\frac{3}{4}}y^{\frac{7}{2}}}\right)^{-\frac{7}{4}}$

$=\left(\dfrac{1}{x^{\frac{11}{4}}y^{\frac{7}{2}}z^{\frac{5}{4}}}\right)^{-\frac{7}{4}}=\boxed{x^{\frac{77}{16}}y^{\frac{49}{8}}z^{\frac{35}{16}}}$

4) $\dfrac{zx^{2}\cdot x^{2}\cdot yx^{\frac{2}{3}}z^{2}}{\left(x^{-\frac{1}{2}}y^{4}z^{2}\right)^{-2}}=\dfrac{x^{\frac{14}{3}}yz^{3}}{xy^{-8}z^{-4}}=\boxed{x^{\frac{11}{3}}y^{9}z^{7}}$

Write each expression in exponential form.

5) $\left(\sqrt[3]{7k}\right)^{4}$

$(7k)^{\frac{4}{3}}$

6) $\dfrac{1}{\left(\sqrt[6]{2a}\right)^{7}}$

$(2a)^{-\frac{7}{6}}$

Write each expression in radical form.

7) $(3p)^{\frac{5}{2}}$

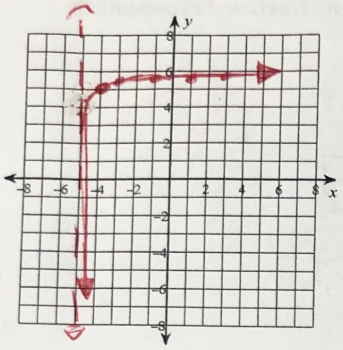
$\left(\sqrt{3p}\right)^{5}$

8) $(6n)^{\frac{2}{3}}$

$\left(\sqrt[3]{6n}\right)^{2}$

Create an x-y table to sketch the graph of the function. Then identify the domain and range of each.

9) $y = \log(x+5) + 5$

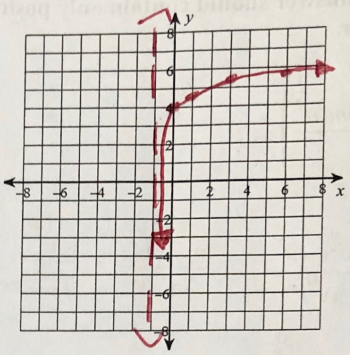


x	y
-5	UNDEFINED
-4	5
-3	5.3
-1	5.6
1	5.78
3	5.9

DOMAIN: $x > -5$

RANGE: $\mathbb{R}$

10) $y = \ln(x+1) + 4$



x	y
-1	UNDEFINED
0	4
1	4.7
3	5.4
6	5.9

DOMAIN: $x > -1$

RANGE: $\mathbb{R}$

Find the total value of the investment after the time given.

11) Use the compound interest formula, $A = P\left(1 + \frac{r}{n}\right)^{nt}$, to find the total amount if \$25,700 in invested at an interest rate of 4% and compounded daily for 5 years.

P r $n = 365$ t

$A = 25{,}700\left(1 + \frac{.04}{365}\right)^{365 \cdot 5}$

$= 25{,}700\,(1.00011)^{1825}$

$= 25{,}700(1.2223)$

$= 31{,}413.11$

12) Use the continuous compounding formula, $A = Pe^{rt}$ to find the total amount if \$13,800 is invested at an interest rate of 6.6% and compounded continuously for 2 years.

P r t

$A = 13{,}800\left(e^{.066 * 2}\right)$

$= 13{,}800\left(e^{.132}\right)$

$= 13{,}800 * 1.14$

$= 15{,}747.29$

Rewrite each equation in exponential form.

13) $\log_x 15 = -\frac{1}{2}$

$x^{-\frac{1}{2}} = 15$

14) $\log_9 x = -2$

$9^{-2} = x$

15) $\log n = 20$

$10^{20} = n$

16) $\ln y = x$

$e^{x} = y$

Rewrite each equation in logarithmic form.

17) $v^u = 107$

$\log_v 107 = u$

18) $y^4 = x$

$\log_y x = 4$

19) $10^n = 107$

$\log 107 = n$

20) $e^u = v$

$\ln v = u$

Use a calculator to approximate each to the nearest thousandth.

21) log 38

1.580

22) ln 5.5

1.705

23) $\log_5 3.95$

$\frac{\log 3.95}{\log 5} = .854$

24) $\log_6 2.9$

$\frac{\log 2.9}{\log 6} = .594$

Expand each logarithm.

25) $\log_9 x^3$

$3\log_9 x$

26) $\log_5 (x \cdot y)$

$\log_5 x + \log_5 y$

27) $\log_5 \frac{x}{y}$

$\log_5 x - \log_5 y$

28) $\log_3 (a \cdot b)^2$

$= 2\log_3 (a \cdot b)$

$= 2\log_3 a + 2\log_3 b$

29) $\log_8 \frac{x^6}{y}$

$= \log_8 x^6 - \log_8 y$

$= 6\log_8 x - \log_8 y$

30) $\log_6 (ab^5)$

$= \log_6 a + \log_6 b^5$

$= \log_6 a + 5\log_6 b$

31) $\log_8 (uv^5 \cdot w)^5$

$= 5\log_8 (uv^5 w)$

$= 5\log_8 u + 5\log_8 v^5 + 5\log_8 w$

$= 5\log_8 u + 25\log_8 v + 5\log_8 w$

32) $\log_7 \frac{zx^6}{y^2}$

$= \log_7 z + \log_7 x^6 - \log_7 y^2$

$= \log_7 z + 6\log_7 x - 2\log_7 y$

33) $\log_2 \left(\frac{x^4}{y \cdot z}\right)^3$

$= 3\log_2 \left(\frac{x^4}{y \cdot z}\right)$

$= 3\log_2 x^4 - 3\log_2 y - 3\log_2 z$

$= 12\log_2 x - 3\log_2 y - 3\log_2 z$

or

$= 12\log_2 x - (3\log_2 y + 3\log_2 z)$