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Date _____
Algebra II

Exponents/Logarithms Review Sheet

Radicals are fractional exponents
Get rid of parenthesis
Negative exponents are fractions
Clean it up: multiply, divide, radical

1. The expression $\sqrt[4]{81x^2y^5}$ is equivalent to

MC strategy

1) $3x^{\frac{1}{2}}y^{\frac{5}{4}}$ 280...
2) $3x^{\frac{1}{2}}y^{\frac{4}{5}}$ 82...
3) $9xy^{\frac{5}{2}}$ 18427...
4) $9xy^{\frac{2}{5}}$ 265...

280...

$(81x^2y^5)^{\frac{1}{4}}$

$81^{\frac{1}{4}}x^{\frac{1}{2}}y^{\frac{5}{4}}$

$3x^{\frac{1}{2}}y^{\frac{5}{4}}$

2. The expression $\left(\frac{m^2}{m^{\frac{1}{3}}}\right)^{-\frac{1}{2}}$ is equivalent to

MC strategy .146...

1) $-\sqrt[6]{m^5}$ -6.8...
2) $\frac{1}{\sqrt[6]{m^5}}$ .146...
3) $-m\sqrt[5]{m}$ -15.8...
4) $\frac{1}{m\sqrt[5]{m}}$ .063...

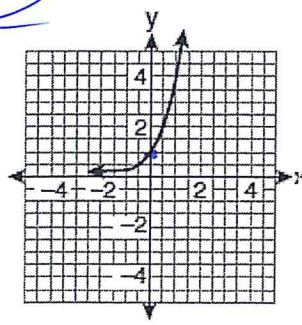
$\frac{m^{-1}}{m^{-\frac{1}{6}}} = \frac{m^{\frac{1}{6}}}{m^1} = m^{\frac{1}{6}-1} = m^{-\frac{5}{6}}$

$\frac{1}{m^{\frac{5}{6}}} = \frac{1}{\sqrt[6]{m^5}}$

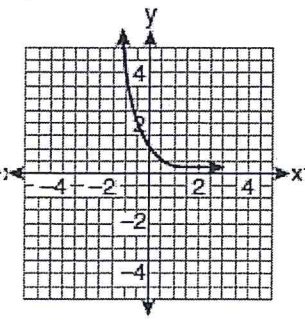
inverse of log is exponential

3. If a function is defined by the equation $f(x) = \log_4 x$, which graph represents the inverse of this function?

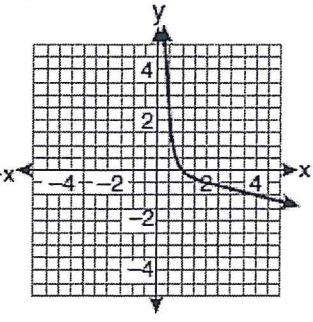
1)



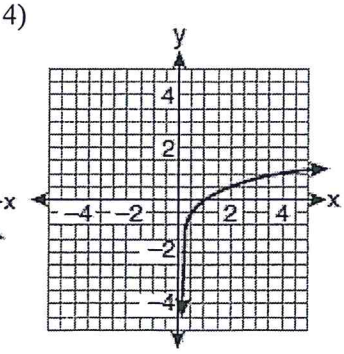
2)



3)

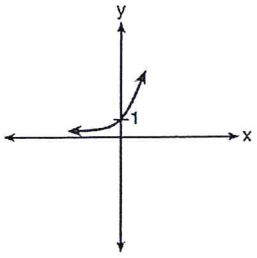


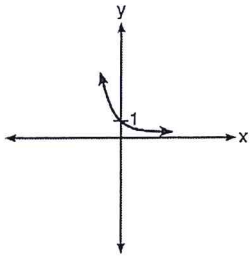
4)

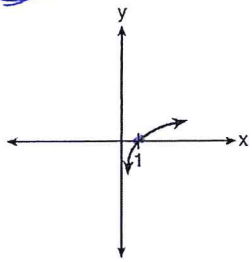


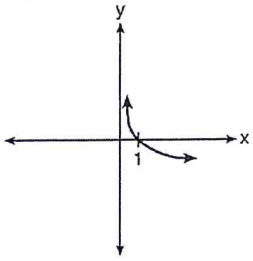
inverse of exponential is log

4. Which sketch shows the inverse of $y = a^x$, where $a > 1$?

1) 

2) 

3) 

4) 

exp	log
(0,1)	(1,0)
y=0	x=0
D: $(-\infty,\infty)$	D: $(0,\infty)$
R: $(0,\infty)$	R: $(-\infty,\infty)$

5. Which statement about the graph of $c(x) = \log_6 x$ is *false*?

1) The asymptote has equation $y = 0$. (x=0) ✗
2) The graph has no y-intercept. ✓
3) The domain is the set of positive reals. ✓
4) The range is the set of all real numbers. ✓

6. Which statement about the graph of the equation $y = e^x$ is *not* true?

1) It is asymptotic to the x-axis. ✓
2) The domain is the set of all real numbers. ✓
3) It lies in Quadrants I and II. ✓
4) It passes through the point $(e, 1)$. ✗

(0,1)

7. Express in simplest form: $\sqrt[3]{\dfrac{x^{-6}y^{12}}{27z^{-9}}}$

$\left(\dfrac{x^{-6}y^{12}}{27z^{-9}}\right)^{\frac{1}{3}}$ $\dfrac{x^{-2}y^{4}}{27^{\frac{1}{3}}z^{-3}} = \dfrac{y^4z^3}{27^{\frac{1}{3}}x^2}$

$\dfrac{y^4z^3}{3x^2}$

Radicals are fractional exponents

Get rid of Parenthesis

Negative exponents are fractions

Clean it up ← multiply, Divide, Radical

8. Express in simplest form: $\sqrt{\dfrac{64m^{-2}n^5}{25z^{-8}}}$

$\left(\dfrac{64m^{-2}n^5}{25z^{-8}}\right)^{\frac{1}{2}}$

$\dfrac{64^{\frac{1}{2}}m^{-1}n^{\frac{5}{2}}}{25^{\frac{1}{2}}z^{-4}} = \dfrac{64^{\frac{1}{2}}n^{\frac{5}{2}}z^4}{25^{\frac{1}{2}}m^1} = \dfrac{8n^{\frac{5}{2}}z^4}{5m}$

Exponential Equations

1) Isolate
2) Constants: raise to the reciprocal power
   Variables: take the log of both sides
3) Solve equation

9. Solve for x: $3x^{\frac{2}{5}} - 11 = 289$

$+11 \quad +11$

$\frac{3x^{\frac{2}{5}}}{3} = \frac{300}{3}$

$(x^{\frac{2}{5}})^{\frac{5}{2}} = (100)^{\frac{5}{2}}$ → $x = 100{,}000$

10. Solve for x: $x^{\frac{1}{5}} - 6 = -8$

$+6 \quad +6$

$(x^{\frac{1}{5}})^{5} = (-2)^{5}$

$x = -32$

11. Drew's parents invested $1,500 in an account such that the value of the investment doubles every seven years. The value of the investment, V, is determined by the equation $V = 1500(2)^{\frac{t}{7}}$, where t represents the number of years since the money was deposited. How many years, to the *nearest tenth of a year*, will it take the value of the investment to reach $1,000,000?

$\frac{1{,}000{,}000}{1500} = \frac{1500(2)^{\frac{t}{7}}}{1500}$

$\log 666.\overline{6} = \log 2^{\frac{t}{7}}$

$(\log 666.\overline{6} = (\frac{t}{7}\log 2)\ ?$ ✓

$\frac{7\log 666.\overline{6}}{\log 2} = \frac{t\log 2}{\log 2}$

$65.7 = t$

12. Juliette deposits $2500 into a bank account where the balance of the account $b(t)$ after t years can be represented by $b(t) = 2500(1.075)^t$. To the nearest tenth of a year:

a) how long will it take for Juliette's money to reach $4000? $b(t)$
b) how long will it take for Juliette's money to double? $b(t) = 2(2500)$
c) how long will it take for Juliette's money to increase by 50%? $b(t) = 1.5(2500)$ → $1+.5 = 1.5$

a)
$\frac{4000}{2500} = \frac{2500(1.075)^t}{2500}$

$\log 1.6 = \log 1.075^t$

$\frac{\log 1.6}{\log 1.075} = \frac{t\log 1.075}{\log 1.075}$

$6.5 = t$

b)
$\frac{2(2500)}{2500} = \frac{2500(1.075)^t}{2500}$

$\log 2 = \log 1.075^t$

$\frac{\log 2}{\log 1.075} = \frac{t\log 1.075}{\log 1.075}$

$9.6 = t$

c)
$\frac{1.5(2500)}{2500} = \frac{2500(1.075)^t}{2500}$

$\log 1.5 = \log 1.075^t$

$\frac{\log 1.5}{\log 1.075} = \frac{t\log 1.075}{\log 1.075}$

$5.6 = t$