Name Key (28pts) **DUE DATE:** _____

Directions:

- *Read each problem carefully and use your knowledge of mathematics to determine your answer.*
- *In order to receive FULL CREDIT you must either SHOW ALL WORK or EXPLAIN how you got your answer!! PLEASE NOTE: A multiple choice answer alone without any work will only receive half credit.*

7pts each

Question	Your Work/Explanation
1) Simplify: $\dfrac{4x\left(\frac{1-x}{4}\right)}{4x\left(3-\frac{4}{x}\right)}$ $\dfrac{x(1-x)}{12x-16}$	$\dfrac{1-x}{4} \cdot \dfrac{x}{3x-4}$ $\dfrac{x(1-x)}{12x-16}$
2) Factor completely: $8x(x-3)^4 - 2x^2(x-3)^3$	$2x(x-3)^3\,(\,4(x-3) - x\,)$ $2x(x-3)^3(3x-12)$
3) Which of the following expressions is equivalent to $\left(\frac{1}{2}a^3\right)^2 (4a^5)^3$? a) $2a^{13}$ b) $16a^{13}$ c) $2a^{21}$ d) $16a^{21}$	$\frac{1}{4}a^6 \cdot 64a^{15}$ $16a^{21}$

4) Find the horizontal asymptotes, if any, of the graph of $f(x) = \frac{3x^2+1}{3x^5+4}$

a) $y = 1$ b) $y = 2$

c) $y = 0$ d) none

$\frac{0x^5}{3x^5}$

$y = 0$

5) Solve for x: $3lne^{2x+1} - 17 = 10$

a) $\frac{-1+ln9}{2}$ b) $\frac{9}{2lne} - \frac{1}{2}$

c) 23 d) 4

$3\ln e^{2x+1} = 27$

$3(2x+1)\ln e = 27$

$6x + 3 = 27$

$6x = 24$

$x = 4$

6) Multiply or find the special product: $(3x + y^7)^3$

a) $x^3 + 9x^2y^7 + 18xy^{14} + 3y^{21}$

b) $27x^3 + 27x^2y^7 + 9xy^{14} + y^{21}$

c) $27x^3 + 9x^2y^7 + 3xy^{14} + y^{21}$

d) $27x^3 + y^{21}$

$(3x+y^7)(3x+y^7)(3x+y^7)$

$(9x^2 + 6xy^7 + y^{14})(3x+y^7)$

$27x^3 + 9x^2y^7 + 18x^2y^7 + 6xy^{14} + 3xy^{14} + y^{21}$

7) Evaluate $g(n-2)$ for the function $g(x) = \frac{x^2-6}{3x}$ and simplify.

$\frac{(n-2)^2-6}{3(n-2)} = \frac{n^2-4n+4-6}{3n-6}$

$\frac{n^2-4n-2}{3n-6}$

8) Solve for x: $3^{1-x} = 5^x$

a) $ln\frac{1}{5}$ b) $ln\frac{3}{5}$

c) $\frac{ln3}{ln15}$ d) $(ln3)(ln15)$

$(1-x)\ln 3 = x \ln 5$

$\ln 3 - x\ln 3 = x\ln 5$

$\ln 3 = x(\ln 5 + \ln 3)$

$x = \frac{\ln 3}{\ln 15}$

9) Factor completely: $6x^2 - 38x - 28$

$2(3x^2 - 19x - 14)$ -42

$3x^2 - 21x + 2x - 14$

$3x(x-7) + 2(x-7)$

$2(3x+2)(x-7)$

6.7
3.14
2.21

10) Use the properties of logarithms to expand: $log_b\left(\frac{x^3y^2}{\sqrt{w}}\right)$

a) $x^3 + y^3 - \sqrt{w}$

b) $\frac{1}{3}log_b x + \frac{1}{2}log_b y - 2log_b w$

c) $3log_b x + 2log_b y - \frac{1}{2}log_b w$

d) $\frac{3logx+2logy}{(1/2)logw}$

4pts each

11) Simplify:

$7\sqrt{27x^5y^2} - 4x\sqrt{75x^3y^2} + 2x^2\sqrt{12xy^2}$

q.3

$7 \cdot \sqrt{9x^4y^2}\sqrt{3x} - 4x\sqrt{25x^2y^2}\sqrt{3x} + 2x^2\sqrt{4y^2}\sqrt{3x}$

$7(3x^2y)$ $\quad -4x(5xy)$ $\quad +2x^2 \cdot 2y$

$21x^2y\sqrt{3x} - 20x^2y\sqrt{3x} + 4x^2y\sqrt{3x}$

$5x^2y\sqrt{3x}$

12) Divide: $(3x^4 - x + 1) \div (x^2 + 1)$

$$\begin{array}{r} 3x^2 - 3 \\ x^2+1 \overline{)\,3x^4 \qquad - x + 1} \\ -(3x^4 + 3x^2) \\ \hline -3x^2 - x + 1 \\ +(+3x^2 \quad +3) \\ \hline -x + 4 \end{array}$$

$3x^2 - 3 + \dfrac{-x+4}{x^2+1}$