Name Key **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.*

Question	Your Work/Explanation
1) Determine the domain of the function $f(x) = \frac{8x}{x(x^2-16)}$ (a) All real numbers $x \neq 16, x \neq 0$ (b) All real numbers $x \neq 4$ (c) All real numbers $x \neq -4, x \neq 4$ (d) All real numbers $x \neq -4, x \neq 4$, $x \neq 0$	$x(x^2-16) = 0$ $x=0$ $x^2=16$ $x=\pm 4$
2) Solve for x: $2^{3x+1} = 5$ .441	$(3x+1)\ln 2 = \ln 5$ $3x+1 = \frac{\ln 5}{\ln 2}$ $\frac{3x}{3} = \frac{\frac{\ln 5}{\ln 2} - 1}{3}$ $x = .441$
3) How many real zeroes does the following polynomial function have? $f(x) = -9x^4 + 81x^2$ (a) one (b) two (c) three (d) four	$-9x^2(x^2-9)$ $x=0$ $x=\pm 3$

4) For the graph of the following quadratic function, which of the following is the direction of the opening and the coordinates of the vertex?

$$f(x) = 2(x+4)^2 + 2$$

-4 2

(a) downward; (-4, 2)

(b) upward; (-4, 2)

(c) downward; (4, -2)

(d) upward; (4, -2)

$y = a(x-h)^2 + k$

$2(x+4)^2 + 2$

+ MEANS upward

(h, k)

$(-4, 2)$

5) Simplify the expression: $\left(\frac{4x^{-3}}{5x^2}\right)^{-3}$

(a) $\frac{64}{125x^{15}}$ (b) $125x^{15}$

(c) $\frac{125x^{15}}{64}$ (d) $64x$

$\frac{4^{-3}x^{9}}{5^{-3}x^{-6}}$

$9 - -6$

$\frac{5^3x^{15}}{4^3}$

6) Find all the zeros of the function $f(x) = x^4 + 9x^2 - 400$.

(a) $\pm 4i, \pm 5$ (b) $\pm 4i, \pm 5i$

(c) $\pm 4, \pm 5i$ (d) $\pm 16i, \pm 2$

$(x^2 - 16)(x^2 + 25)$

$x = \pm 4$ $x = \pm 5i$

7) If $f(x) = 7x - 6$ and $g(x) = 5x - 3$, find $(g \circ f)(1)$.

(a) 1 (b) 7

(c) 2 (d) 8

$f(1) = 7(1) - 6 = 1$

$g(1) = 5(1) - 3 = 2$

8) Rationalize the denominator of the expression. Then simplify the answer.

$$\frac{10}{4-\sqrt{5}}$$

(a) $\frac{100}{21}$ (b) $\frac{10\sqrt{5}}{4\sqrt{5}-5}$

(c) $\frac{40+10\sqrt{5}}{11}$ (d) $\frac{40+\sqrt{5}}{11}$

$$\frac{10}{4-\sqrt{5}} \cdot \frac{4+\sqrt{5}}{4+\sqrt{5}}$$

$$\frac{10(4+\sqrt{5})}{16-5}$$

$$11$$

9) Find the first four terms of the sequence

$$a_n = \frac{4(-1)^n}{n+1}.$$

$$\boxed{-2,\ \frac{4}{3},\ -1,\ \frac{4}{5}}$$

$$a_1 = \frac{4(-1)^1}{2} = \frac{-4}{2} = -2$$

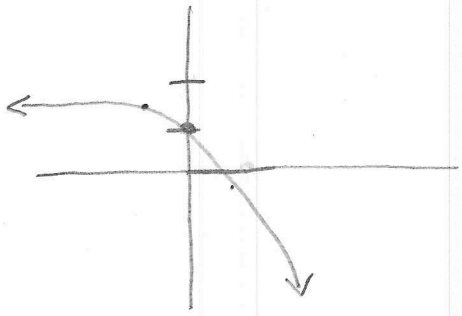
$$a_2 = \frac{4(-1)^2}{3} = \frac{4}{3}$$

$$a_3 = \frac{4(-1)^3}{4} = \frac{-4}{4}$$

$$a_4 = \frac{4(-1)^4}{5} = \frac{4}{5}$$

10) Find the range of $f(x) = 2 - e^x$.

$(-\infty, 2)$



x	y
-1	$2-\frac{1}{e} > 0$
0	$2-1=1$
1	$2-e<0$

11) Find the sum of $\sum_{n=1}^{5} \frac{3}{n+2}$

$$\frac{3}{3} + \frac{3}{4} + \frac{3}{5} + \frac{3}{6} + \frac{3}{7}$$

$$\frac{420 + 315 + 252 + 210 + 180}{420}$$

$$\boxed{\frac{1377}{420} \text{ or } \frac{459}{140}}$$

12) Find the partial fraction decomposition for $\frac{4x - 27}{x^2 - 3x - 10}$. $= \frac{A}{x-5} + \frac{B}{x+2}$

$(x-5)(x+2)$

$$4x - 27 = A(x+2) + B(x-5)$$

$x=5$ $\quad -7 = 7A$

$A = -1$

$x=-2$ $\quad -35 = -7B$

$B = 5$

$$\boxed{\frac{5}{x+2} - \frac{1}{x-5}}$$