KEY

ALG 2 Cumulative Review #1: 2012 Fall Final

You will need to use your own paper to work the following problems.

1. Use the parent graph $f(x) = x^2$ to complete each of the following for $g(x) = -3(x+4)^2 + 11$. You must show all work to receive credit.

a) What are the coordinates of the vertex? $(-4, 11)$

b) Is g(x) a reflection of f(x) over the x-axis, the y-axis, or neither? X-Axis

c) What is the domain written in interval notation? $(-\infty, +\infty)$

d) What is the range written in inequality notation? $(-\infty, 11]$

e) What is the range written in interval notation? $y \leq 11$

f) Write g(x) in standard form. $-3x^2 - 24x - 37$

g) What is the degree of g(x)? 2

h) What is the leading coefficient of g(x)? -3

i) What translation right or left does g(x) have in comparison to f(x)? LEFT 4

j) What translation up or down does g(x) have in comparison to f(x)? Up 11

k) What is the y-intercept? -37

l) What is the constant in h) above ? -3 is the constant in $-3x^2$ but -37 is the constant in the #s about

m) Find the y-coordinates for the point where x = 1. -64

n) What is the name of the parent function? Quadratic $y = x^2$ $a = -3$

o) Does g(x) open up or down and how can you tell ? down $a < 0$, look at sign

p) Create a new function, call it h(x), by moving g(x) up 9 units and 5 units to the left. $-3(x+9)^2 + 20$

q) Does g(x) have a maximum or a minimum and what is it's value ? MAX $(-4, 11)$ or $y \leq 11$

r) What is the equation of the axis (line) of symmetry ? $x = -4$

2. Identify all of the roots of each equation: Use **any** method.

$2x^3 - 42x + 40 = 0$ $\quad -5, 1, 4$

$3x^3 - 18x^2 - 9x + 132 = 0$ $\quad 4, 1 \pm 2\sqrt{3}$

3. Create a polynomial function that has zeros of - 4 ,5, and 3*i*. $(x+4)(x-5)(x-3i)(x+3i) =$ $x^4 - x^3 - 11x^2 - 9x - 180$

4. Solve the equation. Simplify the answers. $4x^2 - 5 = 3$ $\quad \pm\sqrt{2}$

5. Rewrite the equation in vertex form. $x^2 - 4x - 6 = 0$ $\quad (x-2)^2 - 10$ (h, k)

6. Perform the indicated operation and write your answer in standard form.

a. $(-14x + 17 + 9x^2) + (3x - 45)$ $\quad 9x^2 - 11x - 28$

b. $(7x^3 + 10x + 5) - (x^3 - 4x + 5)$ $\quad 6x^3 + 14x$

c. $4y(3x^2 + 6xy)$ $\quad 12x^2y + 24xy^2$

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d. $(x-3)(2x^2+4x-5)$ $2x^3-2x^2-17x+15$ e. $(8x^3+12x^2-6x+15)\div(2x+2)$ $4x^2+2x-5+\frac{25}{2x+2}$

7. Let $f(x)=3x^3-x+4$. Complete each of the following. You must show all work to receive credit.

a. Use synthetic division to divide f(x) by x – 4 .

$$\begin{array}{r|cccc} 4 & 3 & 0 & -1 & 4 \\ + & & 12 & 48 & 188 \\ \hline & 3 & 12 & 47 & 192 \end{array} \qquad 3x^2+12x+47+\frac{192}{x-4}$$

b. Using your answer from above determine if x – 4 is a factor of f(x). You must explain your answer to receive credit.

No - must have A Zero Remainder

c. Use synthetic substitution, not direct substitution, to find f (- 1).

$$\begin{array}{r|cccc} -1 & 3 & 0 & -1 & 4 \\ & & -3 & 3 & -2 \\ \hline & 3 & -3 & 2 & 2 \end{array} \qquad f(-1)=2$$

8. Factor each of the following. Write "prime" if the problem will not factor at all. You must show all work to receive credit.

a. $3x^2-15$ $3(x^2-5)$

b. $4x^2-3x-10$ $(x-2)(4x+5)$

c. $8x^3-27$ $(2x-3)(4x^2+6x+9)$

d. $9x^2-100$ $(3x-10)(3x+10)$

e. $4xy-16x^2y+8x^2y^5$ $4xy(1-4x+2xy^4)$

f. $x^2-19x+34$ $(x-17)(x-2)$

g. $25x^2+4$ Prime

h. $3x^3-12x-x^2+4$ $(x-2)(x+2)(3x-1)$

9. Let $g(x)$ be the transformation of right 2 and down 4 of $f(x)=x^2$. Write the rule for $g(x)$.

A. $g(x)=(x-2)^2-4$
B. $g(x)=(x+2)^2-4$
C. $g(x)=(x-4)^2-2$
D. $g(x)=(x+4)^2-2$
E. $g(x)=-2x^2-4$

10. Reflect the graph of $f(x)=|2x-1|+3$ across the x-axis.

A. $g(x)=|2(-x)-1|+3$
B. $g(x)=-|2x-1|+3$
C. $g(x)=-|2x-1|-3$
D. $g(x)=|-2x+1|+3$
E. $g(x)=-|2x+1|-3$

11. Describe the parent function and its transformation: $f(x)=\sqrt{x-4}+8$

A. square root function, shift left 4, down 8
B. square root function, shift right 4, down 8
C. square root function, shift right 4, up 8
D. rational function, shift right 4, up 8
E. rational function, shift left 4, up 8

12. Describe the parent function and its transformation: $f(x)=2^{x+1}-5$

A. exponential function, shift left 1, down 5
B. square root function, shift right 1, down 5
C. quadratic function, shift right 1, up 5
D. exponential function, shift right 1, up 5
E. exponential function, shift left 1, up 5