Graders: Maginnis, Kinkade, Ghimire

Name:
Recitation Instructor:
Recitation Day and Time:

College Algebra – Exam 1
February 5, 2008

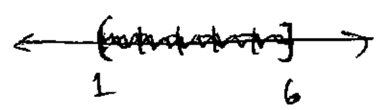
Page 1 26 pts.	Page 2 26 pts.	Page 3 27 pts.	Page 4 21 pts.	TOTAL 100 pts

Directions: You will find 14 problems listed below. The point value of each problem is given in parentheses. Please show all your work neatly and box your final answers. No notes or books are allowed. You have one hour to complete this exam.

1. (6 points) Write in interval notation and then graph on a number line: $\{x \mid 1 < x \leq 6\}$

Interval notation: $(1, 6]$

Number Line:



2. (6 points) Multiply and display answer in standard form: $(x+2)(x^2-5x)$

$$(x+2)(x^2-5x) = x^3-5x^2+2x^2-10x$$
$$= \boxed{x^3-3x^2-10x}$$

3. (6 points) Factor into linear factors: $2x^2+3x-14$

$$\boxed{(2x+7)(x-2)}$$

4. (8 points) Factor into linear factors: $64y^2-81$ (difference of squares)

$$\boxed{(8y-9)(8y+9)}$$

Graders: Natarajan, Mansaku, Kaminski

5. (6 points) Simplify completely: $(27x^3y^6)^{1/3}$

$= 27^{1/3} (x^3)^{1/3} (y^6)^{1/3}$

$= \boxed{3xy^2}$

6. (6 points) State the domain of the following rational expression: $\frac{x+1}{x^2-16}$

$\boxed{x \neq \pm 4}$ (Set $x^2 - 16 = 0$
$(x-4)(x+4) = 0$)

7. (6 points) Simplify and write using positive exponents: $\left(\frac{5m^2}{4n^{-3}}\right)^2$

$\left(\frac{5^2m^4}{4^2n^{-6}}\right) = \boxed{\frac{25m^4n^6}{16}}$

8. (8 points) Find the least common denominator and simplify: $\frac{4}{x+y} + \frac{x-2y}{x^2-y^2}$

LCD: $(x-y)(x+y)$

$\frac{4(x-y)+(x-2y)}{(x+y)(x-y)} = \frac{4x-4y+x-2y}{(x+y)(x-y)} = \boxed{\frac{5x-6y}{(x+y)(x-y)}}$

Graders. Burckel, Trockelman, Moore, Nguyen

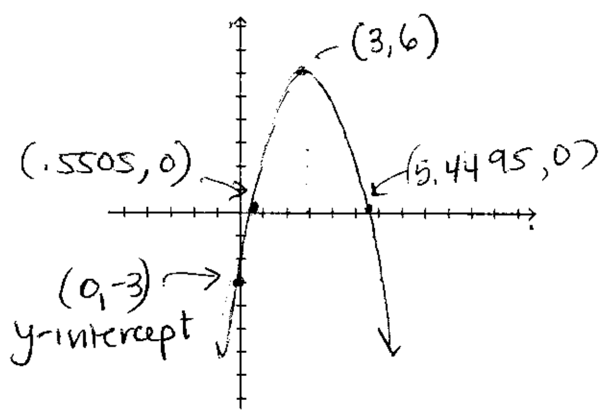
9. (7 points) Express in terms of a single radical (no decimals): $2\sqrt{20} - \sqrt{45}$

$$2\sqrt{20} - \sqrt{45} = 2\sqrt{4 \cdot 5} - \sqrt{9 \cdot 5}$$
$$= 2 \cdot 2\sqrt{5} - 3\sqrt{5}$$
$$= 4\sqrt{5} - 3\sqrt{5} = \sqrt{5}$$

10. (10 points)

(a) On the grid below, graph $f(x) = -x^2 + 6x - 3$ over the following intervals: $-5 \le x \le 10$ and $-7 \le y \le 7$. Along with your graph, you must label axes and intercepts appropriately for full credit.

Need to label axes & intercepts.



(b) Find the x-intercepts of this graph using your TI-83/84 and briefly explain which buttons you used.

① Hit $\boxed{2nd}$ + $\boxed{Trace}$, and this brings up the "calculate" menu. Choose option 2, "zero."

(left bound) ② Using the $\boxed{\leftarrow}$ key, scroll to the left of one of the zeros; hit $\boxed{enter}$;

(right bound) Using the $\boxed{\rightarrow}$ key, scroll to the right of this zero, hit $\boxed{enter}$

(Guess) → Hit $\boxed{enter}$ again. ③ Repeat the process for the other zero.

11. (10 points) The term 'fixed costs' represents the start-up cost of operating a business (for example, machinery and building costs). The term 'variable costs' refers to the cost of producing 1 item. A company's fixed costs for producing photo albums is \$1200, while variable costs are \$4 per album.

(a) Write a cost function modeling this situation.

Let x represent the # of albums ~~sold~~ made:

$$C(x) = 4x + 1200$$

variable cost fixed cost

(b) What is the cost of producing 200 photo albums?

$$C(200) = 4(200) + 1200 = \$2000.$$

Graders: Alnaser, Wiles, Ho

12. (10 points) Given the points $(-4, 3)$ and $(4, -2)$:

(a) Find the distance between the two points.

$$d = \sqrt{(-4-4)^2 + (3-{}^-2)^2} = \sqrt{(-8)^2 + (5)^2} = \sqrt{64+25} = \boxed{\sqrt{89}}$$

(b) Find the slope of the line connecting the two points.

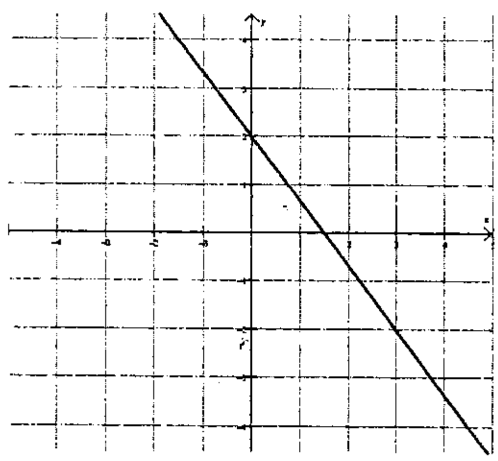
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2-3}{4-{}^-4} = \boxed{\frac{-5}{8}}$$

13. (5 points) Given the graph below, find the equation of the line in slope-intercept form. Each tick mark represents 1 unit.

y-intercept $= 2$

$m = \frac{-4}{3}$

$$\boxed{y = -\frac{4}{3}x + 2}$$



14. (6 points) Evaluate and complete the following function table for $f(t) = t^2 + kt$, where k is some unspecified parameter.

t	-2	-1	0	1	2	3
$f(t)$	$4-2k$	$1-K$	0	$1+k$	$4+2k$	$9+3k$