Key

☐ - not on midterm exam

08-09 MIDTERM EXAM REVIEW
ALGEBRA 2 HONORS (Go over Jan 5th → 9th, 2009)

Radicals: (Simplify)

① $4\sqrt{12} - 8\sqrt{27}$
$8\sqrt{3} - 24\sqrt{3} = \boxed{-16\sqrt{3}}$

② $\sqrt{56a^3b^5c^6}$ $(4\cdot14\cdot a^2\cdot a\cdot b^4\cdot b\cdot c^6)$
$\boxed{2ab^2c^3\sqrt{14ab}}$

③ $(5\sqrt{5}+\sqrt{3})(\sqrt{5}-\sqrt{3})$
$25 - 5\sqrt{15} + \sqrt{15} - 3$
$\boxed{22 - 4\sqrt{15}}$

Chapter 1:

④ Solve for x: $\frac{2x+1}{4} - \frac{x+3}{3} = \frac{10}{12}$
$3(2x+1) - 4(x+3) = 10$
$6x+3-4x-12=10$
$2x = 19$
$\boxed{x = 19/2}$

⑤ Solve: $\frac{1}{2}x - \frac{5}{3} = -\frac{1}{2}x + \frac{19}{4}$ (12)
$6x - 20 = -6x + 57$
$\boxed{x = 77/12}$

⑥ Solve: $-5(2x-1) = 3(x+4) - 2$
$-10x+5 = 3x+12-2$
$-10x+5 = 3x+10$
$\boxed{x = -5/13}$

⑦ Solve: $\frac{3}{4} + 3(x+1) = \frac{5}{4}(2x+5)$
$4(\frac{3}{4} + 3x + 3 = \frac{10}{4}x + \frac{25}{4})$
$3 + 12x + 12 = 10x + 25$
$12x + 15 = 10x + 25$
$2x = 10$
$\boxed{x = 5}$

⑧ Solve for b_1: $A = \frac{1}{2}h(b_1 + b_2)$
$b_1 = \frac{2A}{h} - b_2$ or $\frac{2A - b_2 h}{h}$

⑨ Solve: $2|2x-6| - 8 = 12$
$|2x-6| = 10$
$2x-6 = 10$ or $2x-6 = -10$
$\boxed{x = 8, -2}$

⑩ Solve: $|5x-2| > 10$ (answer in interval notation) $(-\infty, -8/5) \cup (12/5, \infty)$

⑪ Solve: $3a+1 < -2$ or $3a+1 > 7$ $(-\infty, -1) \cup (2, \infty)$

⑫ Solve: $5(x+2) > x - 5$ (answer in interval notation) $(-15/4, \infty)$

⑬ Solve: $|3x+4| \leq 2$ $[-2, -2/3]$

Chapter 2:

⑭ Given $f(x) = 3x+4$ and $g(x) = x^2 - 5$, find $\boxed{f(2) = 10}$ and $\boxed{g(-3) = 4}$

⑮ Find the slope of the line passing through $(-6, 2)$ and $(3, 5)$ $\boxed{m = 1/3}$

⑯ Find the general form of the equation of the line that passes through $(-2, 5)$ and is perpendicular to $x - 3y + 6 = 0$ ($m = 1/3$, $m = -3$)
$\boxed{3x + y = -1}$

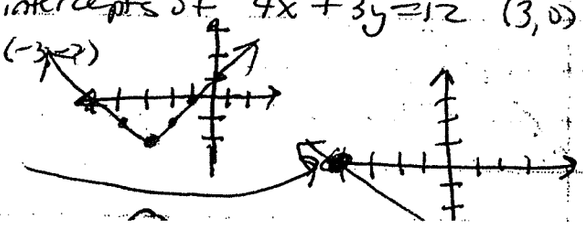
⑰ Find the equation of the line that passes through $(2, 10)$ and is parallel to $x - 4y = 2$ (slope-intercept form) ($m = 1/4$) $\boxed{y = 1/4x + 19/2}$

⑱ Find the equation of the line that passes through $(3, -8)$ and $(8, 2)$ (slope-intercept form). $\boxed{y = 2x - 14}$

⑲ Write the equation of the line that passes through $(-4, 1)$ and has a slope of 3 (slope-intercept form). $\boxed{y = 3x + 13}$

⑳ Determine the x and y intercepts of $4x + 3y = 12$ $(3, 0)$ & $(0, 4)$

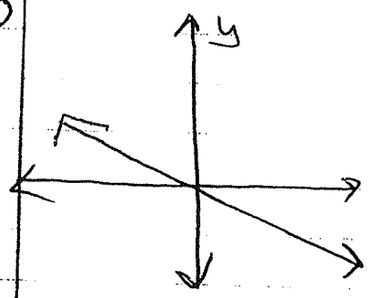
㉑ Graph $y = |x+3| - 2$ (Vertex: $(-3, -2)$)



㉒ Graph: $3x + 4y = -12$

Chapter 2 (continued):

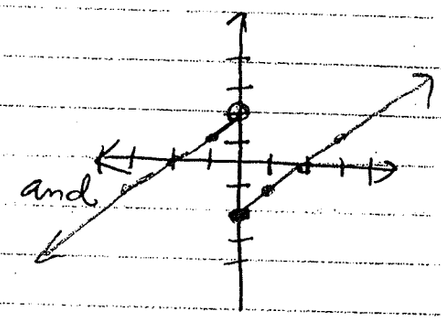
(23)



Describe interval of increasing, decreasing, or constant.

$(-\infty, \infty)$

(24) a) Graph $f(x) = \begin{cases} x-2 & \text{if } x \geq 0 \\ x+2 & \text{if } x < 0 \end{cases}$



and

b) find $f(-2) = -2+2 = \boxed{0}$

Chapter 3:

(25) Solve: $\begin{cases} -6x+5y=4 \\ 7x-10y=-8 \end{cases}$ $-(2x+10y=8)$ $\frac{7x-10y=-8}{-5x=0}$ $x=0$ $(0, 4/5)$

(26) solve: $\begin{cases} 3x+2y=-3 \\ -3(x+1/3y=-4) \end{cases}$ $3x+2y=-3$ $-3x-y=12$ $\boxed{y=9}$

$x+1/3(9)=-4$ $x+3=-4$ $\boxed{x=-7}$ $\boxed{(-7,9)}$

(27) graph the solution set of $\begin{cases} x+y \geq -2 \\ -5x+y < -3 \end{cases}$

$y < 5x-3$

(28) sketch the graph of the plane with equation $5x+4y+2z=20$

$(4,0,0)$ $(0,5,0)$ $(0,0,10)$

(29) Solve for b: $9a+7b=-30$

$-2(8b+5c=11)$ $-16b-10c=-22$

$-3a+10c=73$ $-3a+10c=73$

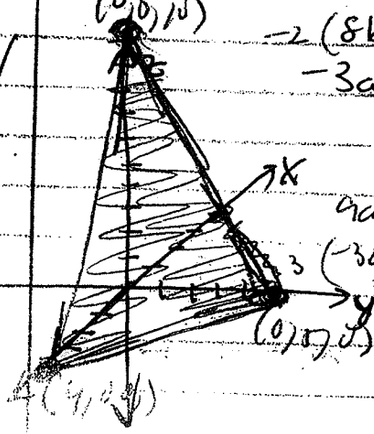
$-3a-16b=51$

$9a+7b=-30 \rightarrow 9a+7b=-30$

$3(-3a-16b=51) \rightarrow -9a-48b=153$

$-41b=123$

$\boxed{b=-3}$



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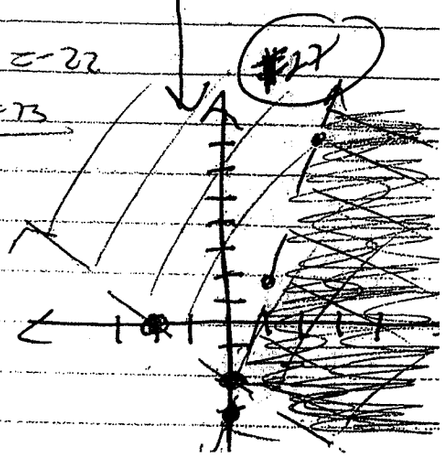

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Chapter 4:

(30) Evaluate the determinant of $A=\begin{bmatrix}-1 & -3\\ 4 & 5\end{bmatrix}$ $-5-(-12)$ $-5+12=\boxed{7}$

(31) Evaluate the determinant of $A=\begin{bmatrix}1 & 1 & 3\\ -2 & 0 & 2\\ 5 & -1 & -4\end{bmatrix}$ $(0+10+6)-(0+-2+8)$ $16-6=\boxed{10}$

(32) Determine the order of the matrix $\begin{bmatrix}-6 & 4 & 3 & 2\\ 1 & 0 & 4 & -1\end{bmatrix}$ $\boxed{2\times 4}$

(33) Solve for x: $\begin{vmatrix}4+2x & 3\\ x-1 & -8\end{vmatrix}=10$ $-8(4+2x)-3(x-1)=10$ $-32-16x-3x+3=10$ $-19x-29=10$ $-19x=39$ $\boxed{x=-39/19}$

(34) Use Cramer's Rule to set up the value of x for:

$8x-6z=38$
$2x-5y+3z=5$
$x+10y-4z=8$
$(4,0,-1)$

$x=\dfrac{\begin{vmatrix}38 & 0 & -6\\ 5 & -5 & 3\\ 8 & 10 & -4\end{vmatrix}}{\begin{vmatrix}8 & 0 & -6\\ 2 & -5 & 3\\ 1 & 10 & -4\end{vmatrix}}=\dfrac{-920}{-230}=4$

(35) Use a determinant to find the area of the triangle with vertices (2,1), (5,3), and (7,1). $\pm\frac{1}{2}\begin{vmatrix}2 & 1 & 1\\ 5 & 3 & 1\\ 7 & 1 & 1\end{vmatrix}=-\frac{1}{2}(-10)=\boxed{5}$

Chapter 5:

(36) Determine the ~~vertex and~~ (1,3) axis of symmetry $\boxed{x=1}$ of the quadratic Function: $f(x)=2x^2-4x+5$ $x=-b/2a=\frac{4}{4}=\boxed{1=x}$

(37) graph: $f(x)=(x-2)^2-4$ vertex (2,-4)

x	y
0	0
1	-3

(38) Factor: $25x^4-64$ $(5x^2+8)(5x^2-8)$

(39) Factor: $(x-3)^2-25$ $(x-3+5)(x-3-5)=(x+2)(x-8)$

(40) Solve by factoring: a) $2x(4x+9)=-4$ $2(4x^2+9x+2)=0$ $8x^2+18x+4=0$ $2(4x+1)(x+2)=0$ $\boxed{x=-1/4,-2}$

b) $2x^3+x^2-18x-9=0$ $x^2(2x+1)-9(2x+1)$ $(x+3)(x-3)(2x+1)=0$

$\frac{7 \pm \sqrt{49-4(10)}}{10} = \frac{7 \pm \sqrt{9}}{10} = \frac{7 \pm 3}{10}$

Chapter 5 continued:

(41) Solve by Quadratic formula: $5x^2 - 7x + 2 = 0$ $\frac{7+3}{10}, \frac{7-3}{10}$ $\{1, 2/5\}$

(42) Solve: $x^2 - 2x - 15 < 0$ $(-3, 5)$

$-3 < x < 5$

(43) Use the square root method to solve: $3x^2 + 24 = 0$

$3x^2 = -24$

$x^2 = -8$

$x = \pm 2i\sqrt{2}$

(44) Simplify and write in standard form: a) $(6+3i) + (6-5i)$ $14-2i$

b) $(-3+5i)(2-3i)$ $9+19i$

(45) Write $\sqrt{-24} + 6$ in standard form

$2i\sqrt{6}$

$6 + 2i\sqrt{6}$

(46) Write $\frac{3i}{2-4i}$ as a complex # in standard form.

$\frac{-12+6i}{20} = \frac{-6+3i}{10}$

Chapter 6:

(47) Determine the number of terms and the degree of the polynomial: $x^4 + x^3y^2 + xy^3 + y^4$ 4 terms, degree = 5

(48) Simplify: $\frac{3}{7}\frac{12xy}{x^4} \cdot \frac{7x^5y^2}{4y} \quad \frac{3x^6y^3}{x^4y} = 3x^2y^2$

(49) Simplify: $\left(\frac{2a^3b^7c^4}{5ab^3}\right)^3 = \left(\frac{2a^2b^4c^4}{5}\right)^3 = \frac{8a^6b^{12}c^{12}}{125}$

(50) Simplify: $(-4x^{-5}y)^0 \; (2^{-1}xy^3)^3$

$1 \cdot \left(\frac{xy^3}{2}\right)^3 = \frac{x^3y^9}{8}$

(51) Simplify: $\frac{(3a-b)^2 + (2a+b)^2}{9a^2 - 6ab + b^2 + 4a^2 + 4ab + b^2} = 13a^2 - 2ab + 2b^2$

(52) Simplify: $(5x^2 - 4x + 2) - (8x^2 + 5x - 3) = -3x^2 - 9x + 5$

(53) Factor: $8x^3 - 125y^3 \; (2x - 5y)(4x^2 + 10xy + 25y^2)$

(54) Divide: $x^3 + 2x^2 - 6x - 9$ by $x + 3$ $x^2 - x - 3$

$$\begin{array}{r|rrrr} -3 & 1 & 2 & -6 & -9 \\ & & -3 & 3 & 9 \\ \hline & 1 & -1 & -3 & 0 \end{array}$$

Chapter 6 continued:

(55) List the possible rational zeros of: $3x^4 + 2x^3 - x + 15$

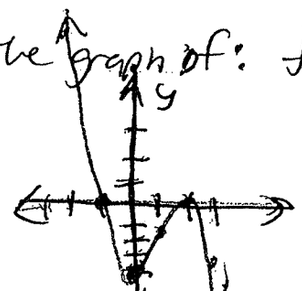
$\frac{\pm 1, \pm 3, \pm 5, \pm 15}{\pm 1, \pm 3} = \pm 1, \pm \frac{1}{3}, \pm 3, \pm 5, \pm \frac{5}{3}, \pm 15$

(56) Solve the equation: $x^4 + 3x^3 + 3x^2 - 3x - 4 = 0$

$1, -1, \frac{-3 \pm \sqrt{17}}{2}$

(57) Sketch the graph of: $f(x) = -(x+1)(x-2)^2$

-1, 2



x	y
0	-4
1	-2
3	-4
-2	8

(58) Find the polynomial of degree 3 that has zeros: -3 and i $f(x) = (x+3)(x-i)(x+i)$

$f(x) = x^3 + 3x^2 + x + 3$

(59) Simplify: $\left[\frac{2a^3bc^5}{3ab^3}\right]^3$

$= \left(\frac{2a^2c^5}{3b^2}\right)^3 = \frac{8a^6c^{15}}{27b^6}$

(60) Evaluate: $\frac{4}{3^{-3}} = 4 \cdot 3^3$

$4 \cdot 27 = 108$