Algebra 2: Review
First Semester Final

① $|2x-3|=10$

$2x-3=10$ $\quad 2x-3=-10$

$2x=13$ $\quad 2x=-7$

$x=\frac{13}{2}$ $\quad x=\frac{-7}{2}$

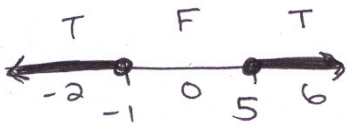
② $|6-3x|\geq 9$

$|6-3x|=9$

$6-3x=9$ $\quad 6-3x=-9$

$-3x=3$ $\quad -3x=-15$

$x=-1$ $\quad x=5$



$x\leq -1$ or $x\geq 5$

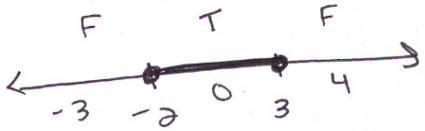
③ $\left|\frac{4x-2}{5}\right|\leq 2$

$\frac{4x-2}{5}=2$ $\quad \frac{4x-2}{5}=-2$

$4x-2=10$ $\quad 4x-2=-10$

$4x=12$ $\quad 4x=-8$

$x=3$ $\quad x=-2$



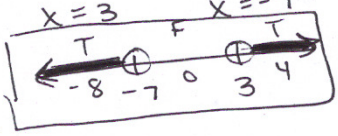
$-2\leq x\leq 3$

④ $|x+2|>5$

$|x+2|=5$

$x+2=5$ $\quad x+2=-5$

$x=3$ $\quad x=-7$



⑤ $\begin{cases} y=4x-3 \\ 3x-y=7 \end{cases}$

$3x-(4x-3)=7$

$3x-4x+3=7$

$-x+3=7$

$-x=4$

$x=-4$

⑥ $\begin{cases} (-2x-4y)=(-4)2 \\ 4x-y=-10 \end{cases}$

$-4x-8y=-8$

$4x-y=-10$

$-9y=-18$

$\frac{-9y}{-9}=\frac{-18}{-9}$

$y=2$

⑦ ① $x-3y+2z=5$

② $2x-6y+4z=10$

③ $x+2y-z=-2$

$-2(x-3y+2z)=(5)-2$

② $2x-6y+4z=10$

$-2x+6y-4z=-10$

$2x-6y+4z=10$

$0=0$

Inf. many Solutions

⑧ $\begin{cases} 2x+y=-3 \rightarrow y=-2x-3 \\ x-z=-6 \rightarrow z=x+6 \\ 3y+z=7 \end{cases}$

$3(-2x-3)+(x+6)=7$

$-6x-9+x+6=7$

$-5x-3=7$

$-5x=10$

$x=-2$

⑨ c = # carnations $\quad d$ = # daisies

$c+d=10 \rightarrow c=10-d$

$5c+3d=46$

$5(10-d)+3d=46$

$50-5d+3d=46$

$50-2d=46$

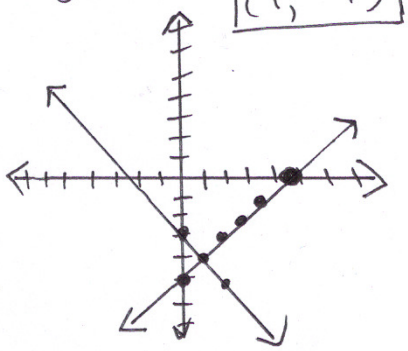
$-2d=-4$

$d=2$

$c=8$

⑩ $\begin{cases} x+y=-3 \rightarrow y=-x-3 \\ y=x-5 \end{cases}$

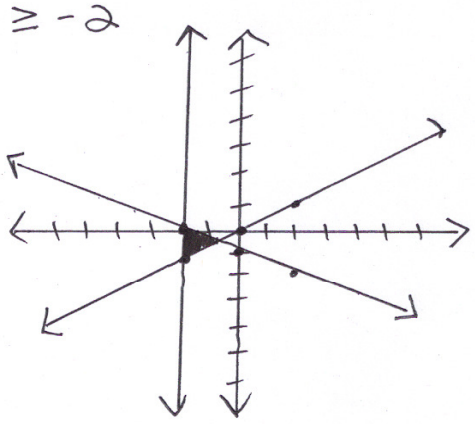
$(1,-4)$



(11) $x+2y \le -2 \rightarrow 2y \le -x-2$, $y \le -\frac{1}{2}x-1$

$y \ge \frac{1}{2}x$

$x \ge -2$



(12) $7i(5i)$

$35i^2$

$35(-1)$

$\boxed{-35}$

(13) $(8+i)(8-i)$

$64-8i+8i-i^2$

$64-i^2$

$64-(-1)$

$\boxed{65}$

(14) $i^{15} = \boxed{-i}$

$i^1 = i$

$i^2 = -1$

$i^3 = -i$

$i^4 = 1$

(15) $(8-3i)+(2+6i)$

$\boxed{10+3i}$

(16) $(7-i)-(4-5i)$

$7-i-4+5i$

$\boxed{3+4i}$

(17) $\left(\frac{5}{3+i}\right)\left(\frac{3-i}{3-i}\right) = \frac{15-5i}{9-3i+3i-i^2} = \frac{15-5i}{9-i^2}$

$= \frac{15-5i}{9-(-1)}$

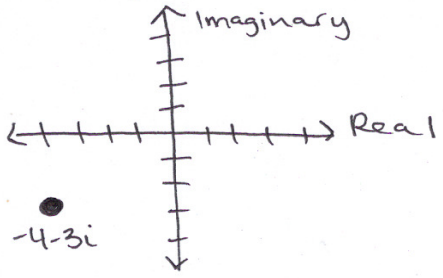
$= \frac{15-5i}{10}$

$= \boxed{\frac{3}{2}-\frac{1}{2}i}$

(18) $\left(\frac{2-3i}{4+2i}\right)\left(\frac{4-2i}{4-2i}\right) = \frac{8-4i-12i+6i^2}{16-8i+8i-4i^2}$

$= \frac{8-16i+6(-1)}{16-4(-1)} = \frac{2-16i}{20} = \boxed{\frac{1}{10}-\frac{4}{5}i}$

(19) Graph $-4-3i$



(20) $x^2+2x+26=0$

$x = \frac{-2 \pm \sqrt{(2)^2-4(1)(26)}}{2(1)}$

$= \frac{-2 \pm \sqrt{4-104}}{2}$

$= \frac{-2 \pm \sqrt{-100}}{2}$

$= \frac{-2 \pm 10i}{2}$

$= \boxed{-1 \pm 5i}$

(21) $3x^2-3=45$

$3x^2=48$

$\sqrt{x^2}=\sqrt{16}$

$\boxed{x=\pm 4}$

(22) $x^2+49=0$

$-49 \quad -49$

$\sqrt{x^2}=\sqrt{-49}$

$\boxed{x=\pm 7i}$

(23) $x^2=9x$

$x^2-9x=0$

$x(x-9)=0$

$x=0 \quad x-9=0$

$\boxed{x=0 \quad x=9}$

(24) $y = 6x^2 + x - 2$

$0 = 6x^2 + x - 2$

$0 = (3x+2)(2x-1)$

$3x+2=0 \quad 2x-1=0$

$\boxed{x = -\frac{2}{3} \quad x = \frac{1}{2}}$

(25) $0 = x^2 + 5x - 24$

$0 = (x+8)(x-3)$

$x+8=0 \quad x-3=0$

$\boxed{x=-8 \quad x=3}$

(26) $x = 1^{st}\#$ $y = 2^{nd}\#$

1) $y = x+5$

2) $xy = x + y - 7$

$x(x+5) = x + (x+5) - 7$

$x^2 + 5x = 2x - 2$

$x^2 + 3x + 2 = 0$

$(x+1)(x+2) = 0$

$x=-1$	$x=-2$
$y=4$	$y=3$

(27) Max Value

$f(x) = -2(x-7)^2 + 4$

vertex: $(7,4)$

$\boxed{\text{max. value } 4}$

(28) min. point

$y = x^2 - 6x + 1$

$\left(\frac{b}{2}\right)^2$

$\left(\frac{-6}{2}\right)^2$

$(-3)^2$

9

$y = x^2 - 6x + 9 + 1 - 9$

$y = (x-3)^2 - 8$

$\boxed{\text{vertex: } (3,-8)}$

(29) vertex point

$y = 6(x+1)^2 - 9$

$\boxed{(-1,-9)}$

(30) If $a>1$, $y=ax^2$ is thinner than $y=x^2$

If $0<a<1$, $y=ax^2$ is wider than $y=x^2$

(31) $y = (x+5)^2 - 1 \longrightarrow y = (x-4)^2 + 6$

vertex: $(-5,-1) \longrightarrow$ vertex: $(4,6)$

$\boxed{\text{Right 9 units, Up 7 units}}$

(32) $y = 3(x+4)^2 - 1$

$y = 3(x+4)^2 + 2$

$\boxed{B}$

(33) $\boxed{\begin{array}{l} b = -4 \\ c = 5 \end{array}}$

(34) $y = 3x^2 - 18x + 2$

$\left(\frac{b}{2}\right)^2 \quad y = 3(x^2 - 6x) + 2$

$\left(\frac{-6}{2}\right)^2 \quad y = 3(x^2 - 6x + 9) + 2 - 27$

9

$\boxed{y = 3(x-3)^2 - 25}$

(35) $y = 2(x-4)^2 - 3$

vertex $(4,-3)$

y-int $(x=0)$

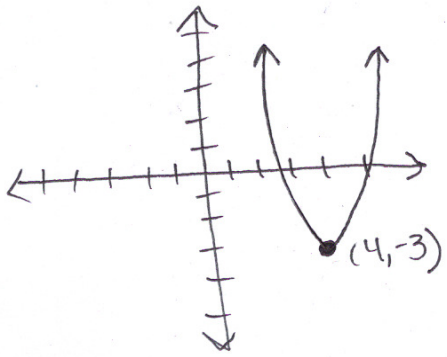
$y = 2(0-4)^2 - 3$

$= 2(-4)^2 - 3$

$= 2(16) - 3$

$= 32 - 3$

$= 29$



(36) $49^{-1/2}$

$\frac{1}{49^{1/2}}$

$\frac{1}{\sqrt{49}}$

$\frac{1}{7}$

(37) $64^{2/3}$

$(\sqrt[3]{64})^2$

$(4)^2$

16

(38) $\frac{2^{2/3}}{2^{-1/5}}$

$2^{2/3} \cdot 2^{1/5}$

$2^{10/15} \cdot 2^{3/15}$

$2^{13/15}$

(39) $8^{7/8} \cdot 8^{1/2}$

$8^{7/8} \cdot 8^{4/8}$

$8^{11/8}$

(40) $\frac{1}{n^{-4}}$

n^4

(41) $(-27)^{4/3}$

$(\sqrt[3]{-27})^4$

$(-3)^4$

81

(42) $(12^{1/3})^{3/4}$

$12^{3/12}$

$12^{1/4}$

(43) $\sqrt[3]{54x^{11}}$

$\sqrt[3]{27 \cdot 2 \cdot x^3 \cdot x^3 \cdot x^3 \cdot x^2}$

$3 \cdot x \cdot x \cdot x \cdot \sqrt[3]{2x^2}$

$3x^3 \cdot \sqrt[3]{2x^2}$

(44) $\frac{5a^4b^2c^{-2}}{(a^2bc^{-3})^3}$

$\frac{5a^4b^2c^{-2}}{a^6b^3c^{-9}}$

$\frac{5a^4b^2c^9}{a^6b^3c^2}$

$5a^{-2}b^{-1}c^7$

$\frac{5c^7}{a^2b}$

(45) $\frac{20x^{-4}}{9y^6} \div \frac{4x^{-2}}{18y^{-1}}$

$\frac{\cancel{20}^{5}x^{-4}}{9y^6} \cdot \frac{\cancel{18}^{2}y^{-1}}{\cancel{4}x^{-2}}$

$\frac{10x^{-4}y^{-1}}{x^{-2}y^6} \rightarrow \frac{10x^2}{x^4y^1y^6}$

$\frac{10x^{-2}}{y^7} \rightarrow \frac{10}{x^2y^7}$

(46) $(2x^4y^{-2})^{-3}$

$2^{-3}x^{-12}y^6$

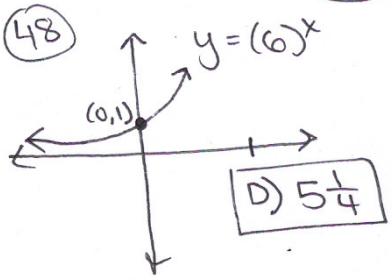
$\frac{y^6}{8x^{12}}$

(47) $(-4x^5y^0)^2(2x^{-3}y^2)$

$(16x^{10}y^0)(2x^{-3}y^2)$

$32x^7y^2$

(48)



D) $5\frac{1}{4}$

(49) $y = A(\frac{1}{3})^{\frac{t}{400}}$

$y = 4500(\frac{1}{3})^{\frac{800}{400}}$

$= 4500(\frac{1}{3})^2$

$= 4500(\frac{1}{9})$

$y = 500$ grams

(50) y-int: 300

$a = 2$

$y = c(a)^t$

$y = 300(2)^t$