

Cumulative Review #2

- ① $-9i$ ② $36 - 25i^2$ ③ $12 + 3 - 10i - 4i$ ④ $i + -1 + -1$

$$\boxed{61}$$

$$\boxed{15 - 14i}$$

$$\boxed{-2 + i}$$

⑤ $\frac{(2-5i)(i)}{i(i)} \rightarrow \frac{2i+5}{-1} \rightarrow \boxed{-5-2i}$

⑥ $\frac{(2-5i)(3-4i)}{(3+4i)(3-4i)} = \frac{6-8i-15i+20i^2}{9+16}$

$$\frac{-14-23i}{25} \Rightarrow \frac{-14}{25} - \frac{23}{25}i$$

⑦ $x^2 + 9 \rightarrow \boxed{(x+3i)(x-3i)}$

⑨ $x^2 + 2ix + 3 = 0$

$$x = \frac{-2i \pm \sqrt{(2i)^2 - 4(1)(3)}}{2}$$

$$= \frac{-2i \pm \sqrt{-4-12}}{2}$$

$$= -i \pm 2i$$

$$\boxed{-3i}$$

$$\boxed{i}$$

or factor:
 $(x+3i)(x-i)$

⑧ $3x^2 - 4x + 2 = 0$

$$x = \frac{4 \pm \sqrt{16 - 4(3)(2)}}{2(3)}$$

$$= \frac{4 \pm \sqrt{-8}}{6}$$

$$x = \boxed{\frac{2}{3} \pm \frac{i\sqrt{2}}{3}}$$

⑩ $\sqrt{x+8} = 3-i$
 $x+8 = 9-6i+i^2$
 $x = \boxed{-6i}$

⑪ a) $3x^2 - 4x + 2 = 0$
 $b^2 - 4ac$
 $16 - 24$
 $-8 = \text{discriminant}$
 $\boxed{2 \text{ complex roots}}$

b) $5^2 - 4(1)(-3)$
 $25 + 12$
 $37 = \text{discriminant}$
 $\boxed{2 \text{ real, irrational roots}}$

⑫ $m = \frac{-3-2}{7+8}$
 $= \frac{-5}{15} \Rightarrow -\frac{1}{3}$

$$m_{\perp} = 3$$

$$x_{\text{midpt}} = \frac{7-8}{2} = -\frac{1}{2}$$

$$y_{\text{midpt}} = \frac{-3+2}{2} = -\frac{1}{2}$$

$$\text{midpt } (-\frac{1}{2}, -\frac{1}{2})$$

$$y = mx + b$$

 $-\frac{1}{2} = 3(-\frac{1}{2}) + b$
 $b = 1$

$$\boxed{y = 3x + 1}$$

⑬ $(\frac{1}{a} - \frac{1}{b} = \frac{1}{x})(abx)$ OR $\frac{b}{ab} - \frac{a}{ab} = \frac{1}{x}$
 $bx - ax = ab$
 $x(b-a) = ab$

$$\boxed{x = \frac{ab}{b-a}, a \neq b}$$

$$\frac{(b-a)}{ab} = \frac{1}{x}$$

$$\boxed{x = \frac{ab}{b-a}}$$

14) $-2y = -5x + 10$
 $y = \frac{5}{2}x - 5$
 $m = \frac{5}{2}$

$y = mx + b$
 $-2 = (\frac{5}{2})(-1) + b$
 $-2 + \frac{5}{2} = b$
 $\frac{1}{2} = b$

$y = \frac{5}{2}x + \frac{1}{2}$

15) a) $2x - y = 5$
 $x - y = 3$
 $\frac{-x + y = -3}{2x - y = 5}$
 $x = 2$
 $y = -1$
(2, -1)
 ck: $4 + 1 = 5$
 $2 + 1 = 3$

b) $5x - 3y - 3x = -6$
 $2x - 3y = -6$
 $-2x + 3y = -3$
 $0 = -9$
{ }

c) $3x + y = 1$
 $-6x - 2y = -2$
 $6x + 2y = 2$
 $0 = 0$
 {PR's}

d) $5x - 2y = 20$
 $10x - 4y = 40$
 $7x + 4y = 11$
 $17x = 51$
 $x = 3$
 $-2y = 20 - 15$
 $y = -\frac{5}{2}$
(3, -\frac{5}{2})

16) Let B = Bob's age
 $B + 4 = \text{Alice's age}$
 $\frac{3}{2}(B - 2) = (B + 4 - 2)$
 $\frac{3}{2}B - 3 = B + 2$
 $\frac{1}{2}B = 5$
 $B = 10$

Bob = 10 yrs.
 Alice = 14 yrs.

ck: 2 years ago:
 Bob is 8
 Alice is 12
 Was Alice $\frac{1}{2}$ x Bob's?
 Yes ✓

18) $\frac{(\frac{1}{a} - b)ac}{(\frac{a}{b} - a)ab}$

$\frac{b - ab^2}{a^2 - a^2b} \rightarrow \frac{b(1 - ab)}{a^2(1 - b)}$

$\frac{1}{a} - \frac{ab}{a} \rightarrow \frac{1 - ab}{a}$

$\frac{a}{b} - \frac{ab}{b} \rightarrow \frac{a - ab}{b}$

$\frac{(1 - ab) \cdot b}{a \cdot a(1 - b)}$

19) $y = \frac{kx}{z}$
 $12 = \frac{k(2)}{7}$
 $42 = k$

$y = \frac{42x}{z}$

$y = \frac{42(3)}{39}$

$y = 14$

22) Let x = # rect. containers
 $y = \# \text{ cyl. containers}$

$100x + 200y \leq 4200$
 $200x + 100y \leq 4800$

Profit = $60x + 60y$

See graph paper

20) $\frac{x^5}{x^3(1-x^2)} \rightarrow \frac{x^2}{1-x^2}$

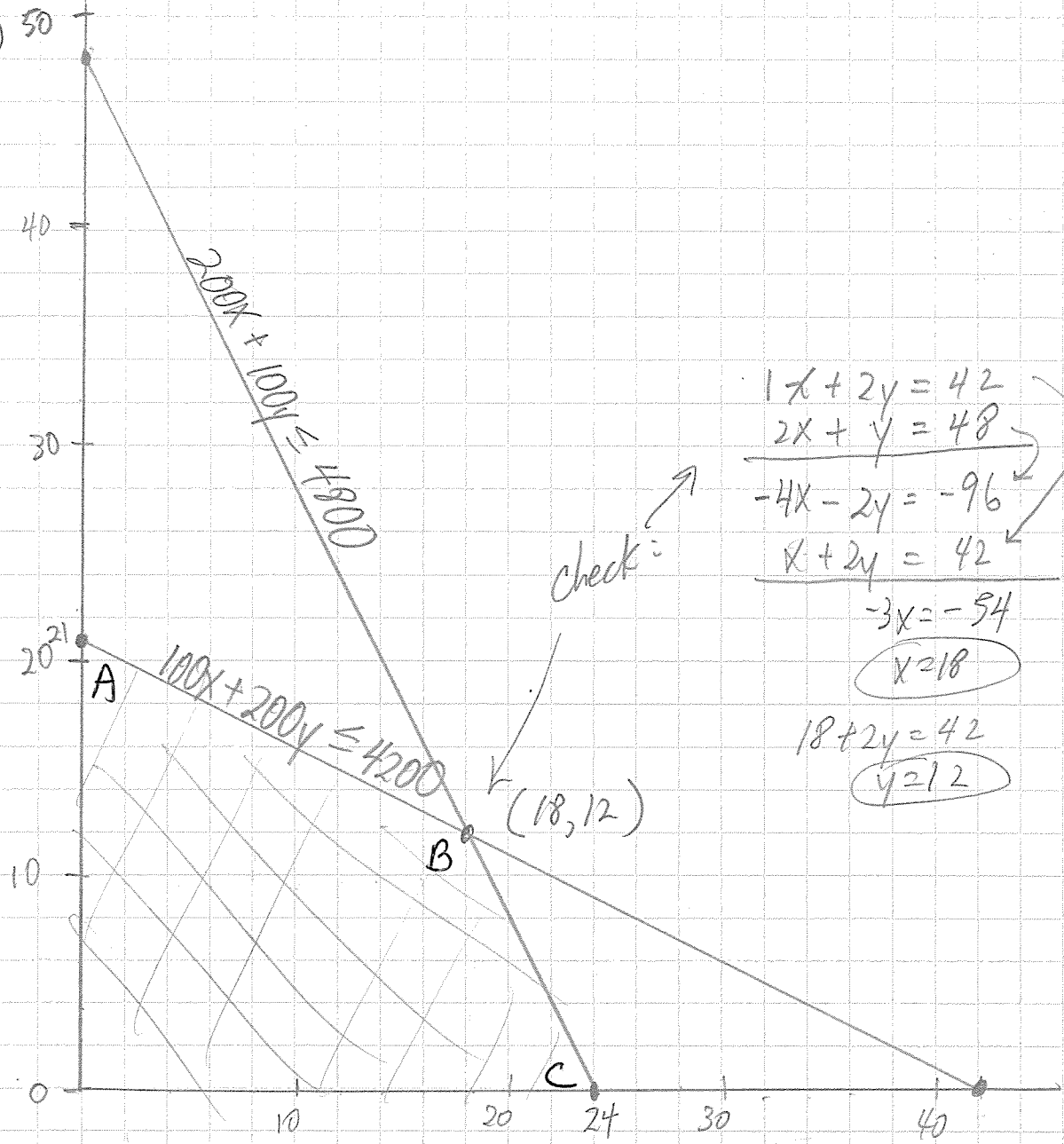
21) $(x-2)(x-(1-i))(x-(1+i)) = y$
 $(x-2)(x-1+i)(x-1-i) = y$
 $(x-2)[(x-1)+i][(x-1)-i] = y$
 $(x-2)(x-1)^2 - i^2 = y$

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

$x^3 - 4x^2 + 6x - 4 = P(x)$

CR #2
#cylindrical

(22)



$$\begin{array}{r}
 x + 2y = 42 \\
 2x + y = 48 \\
 \hline
 -4x - 2y = -96 \\
 x + 2y = 42 \\
 \hline
 -3x = -54 \\
 x = 18 \\
 18 + 2y = 42 \\
 y = 12
 \end{array}$$

rectangular

Point	Profit = $60x + 60y$
A(0, 21)	1260
B(18, 12)	1800
C(24, 0)	1440

Use 18 rectangular
and 12 cylindrical
Profit of \$1800

