

11/22/72

γ FORMULAS

① P1/P2 $\gamma = -3.8215 \left\{ \log \frac{P1}{P2} + 0.3387 \right\}$; $\frac{P1}{P2} < 3$

② P2/P3 $\gamma = -3.797 \left\{ \log \frac{P2}{P3} + 0.3216 \right\}$; $\frac{P2}{P3} < 3$

P3/P4 NO , UNSUITABLE

③ P4/P5 $\gamma = -3.245 \left\{ \log \frac{P4}{P5} + 0.1087 \right\}$; $\frac{P4}{P5} < 10$

P5/P6 NO , UNSUITABLE

P6/P7 NO , UNSUITABLE

12/1/72
reversion from .301 because of geometric factor

④ P5/P7 $\gamma = -1.884 \left(\log \frac{P5}{P7} - .546 \right)$; $2 < \frac{P5}{P7} < 1000$

⑤ P7/P8 $\gamma = -3.720 \left\{ \log \frac{P7}{P8} + .2955 \right\}$; $\frac{P7}{P8} > .9$

⑥ P8/P9 $\gamma = -3.448 \left\{ \log \frac{P8}{P9} + .2724 \right\}$ NONE

⑦ P9/P10 $\gamma = -4.393 \left\{ \log \frac{P9}{P10} - 0.0492 \right\}$ NONE

P10/P11 USE OLD RATIO TABLE

⑧ A3/A4 $\gamma = -2.419 \left(\log \frac{A3}{A4} + .523 \right)$ $\frac{A3}{A4} > .15$

⑨ A4/A5 $\gamma = -2.25 \left(\log \frac{A4}{A5} + .398 \right)$ $\frac{A4}{A5} > .5$

-.2756 geo fact revo

⑩ A5/A6 $\gamma = -2.89 \left(\log \frac{A5}{A6} + .268 \right)$ $\frac{A5}{A6} > 1.8$

(11) $\underline{z_1/z_2}$ $\gamma = -3.148 \left(\log \frac{z_1^*}{z_2} + .4282 \right)$ NONE

$z^* \equiv z_1 - z_2$

(12) $\underline{P_4/A_3}$ $\frac{P}{\alpha} = \frac{\frac{P_4}{A_3} + 0.0232\gamma}{1 + 0.0448\gamma}$ NONE

(13) $\underline{P_5/A_4}$ $\frac{P}{\alpha} = \left\{ 0.3239\gamma + 1.675 \right\} \left(\frac{P_5}{A_4} \right)^{[1.12 + 0.04176(\gamma + 1.5)^2]}$ $\underline{-4.5 \leq \gamma \leq 1.0}$

(14) $\underline{P_8/A_6}$ $\frac{P}{\alpha} = \frac{1.68 \text{ change due to geo. factor}}{A_6} \exp \left\{ \frac{\gamma + 2.434}{1.5526} \right\}$ $-1 \leq \gamma \leq -6$

(15) $\underline{A_3/z_2}$ $\frac{\alpha}{0} = \frac{A_3}{z_2} \cdot \frac{60}{[\exp \left\{ \frac{\gamma + 23.717}{5.8150} \right\} - 21]}$ $-5.5 \leq \gamma \leq 1$



$\frac{\alpha}{M} = \frac{A_3}{z_2} \cdot \frac{37.5}{[\exp \left\{ \frac{\gamma + 23.717}{5.8152} \right\} - 21]}$ $-5.5 \leq \gamma \leq 1$

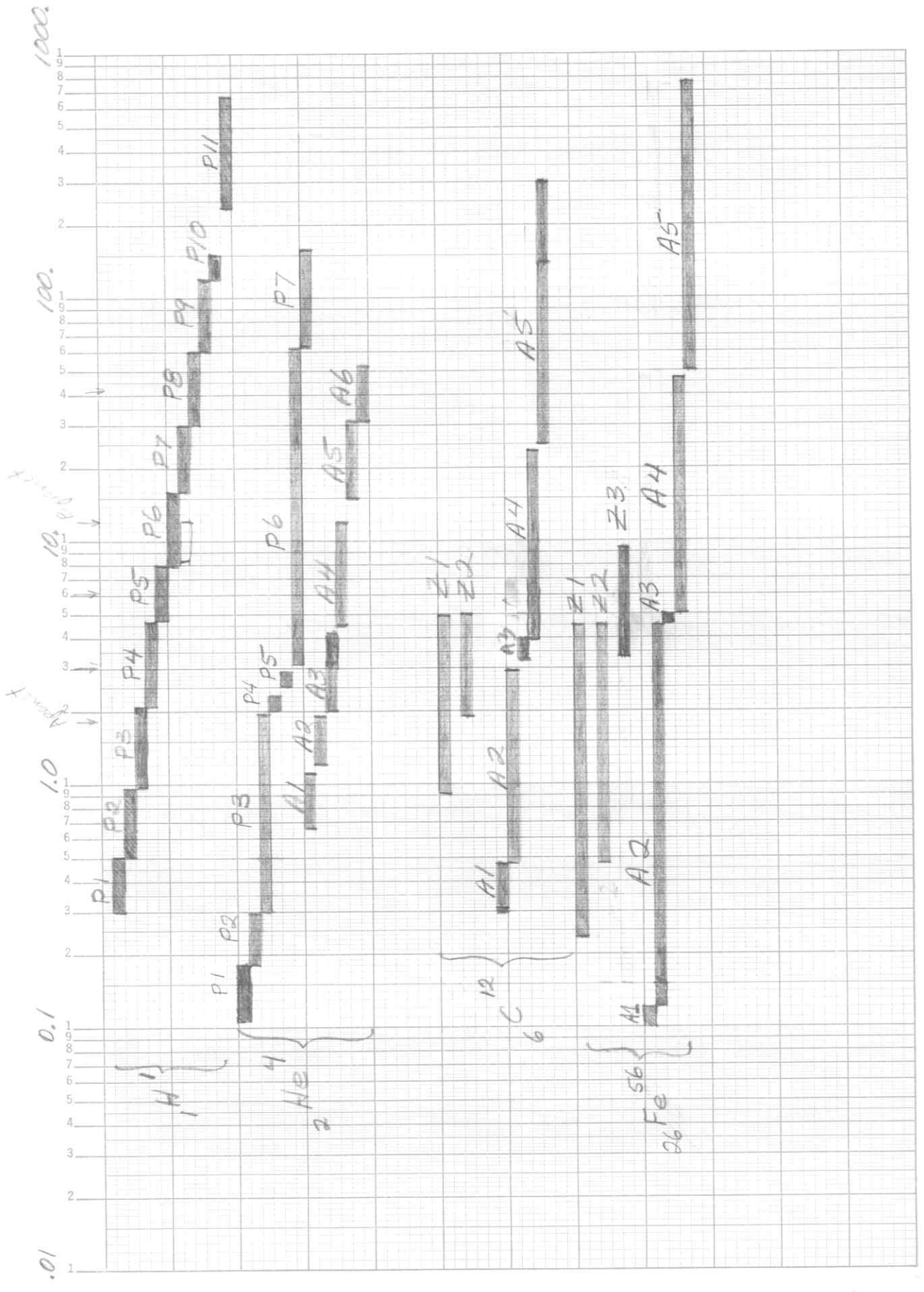
(16) $\underline{z_2/z_3}$ TABLE LOOK-UP

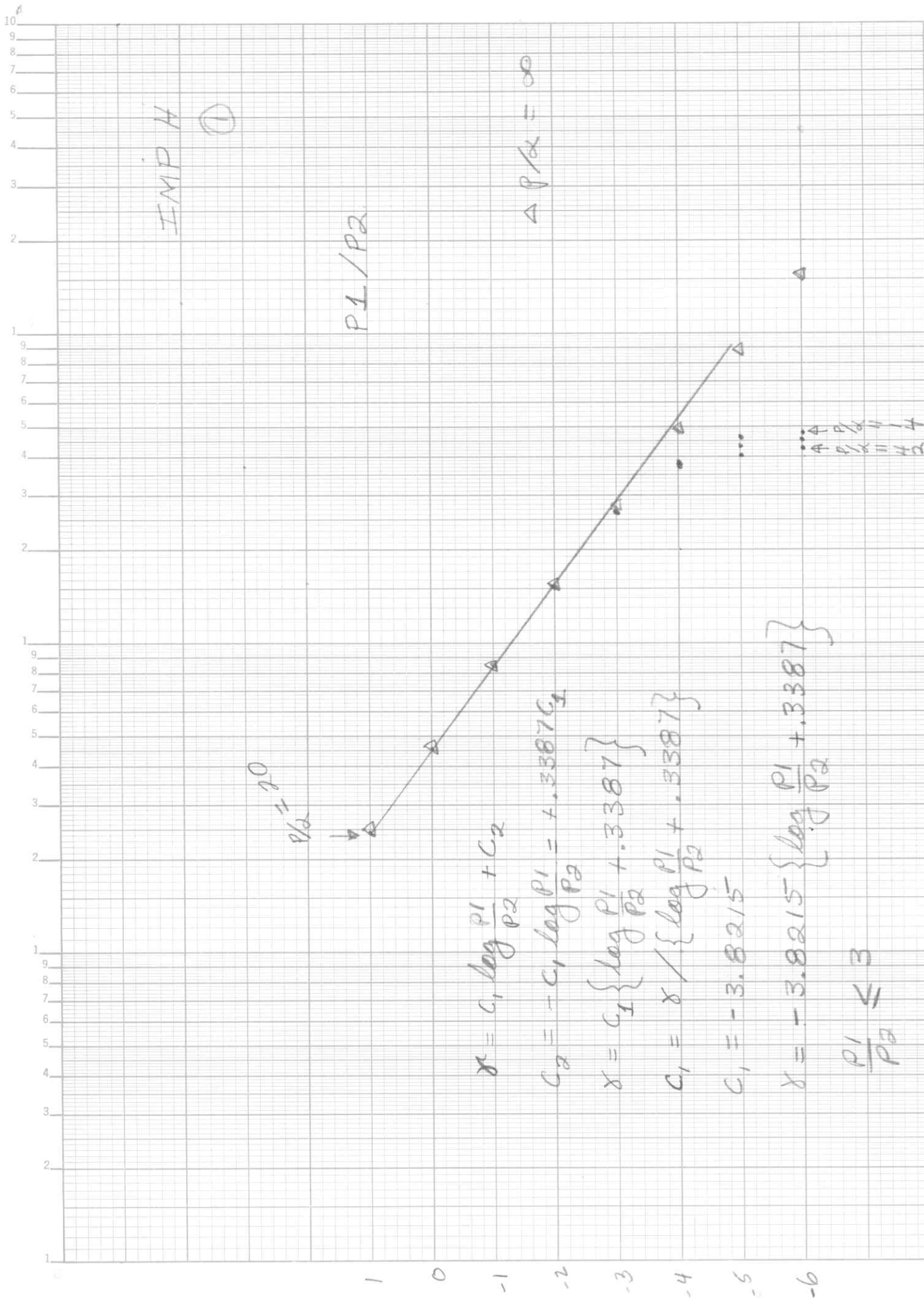
9/16/72

22.5°

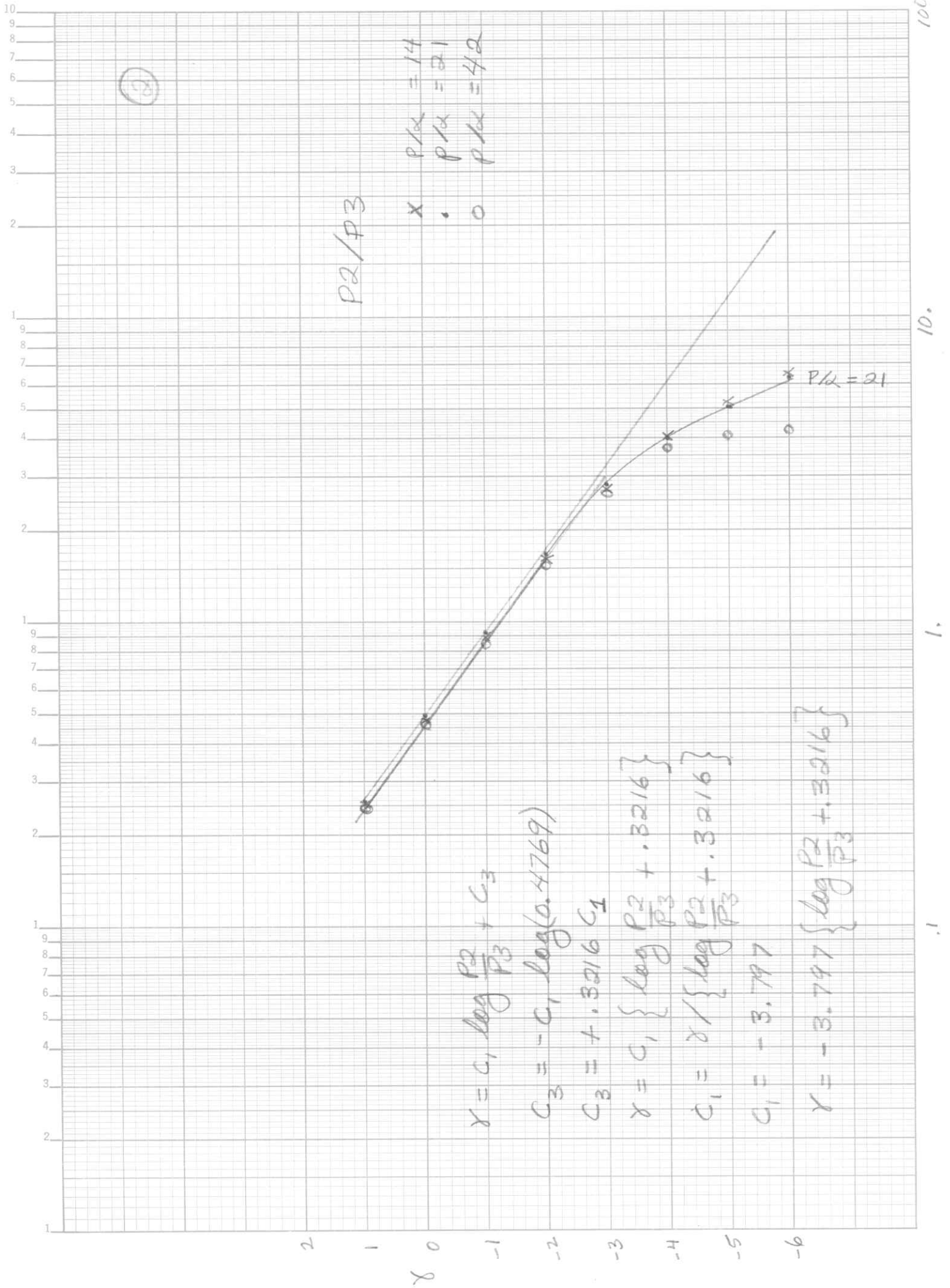
APPI-10

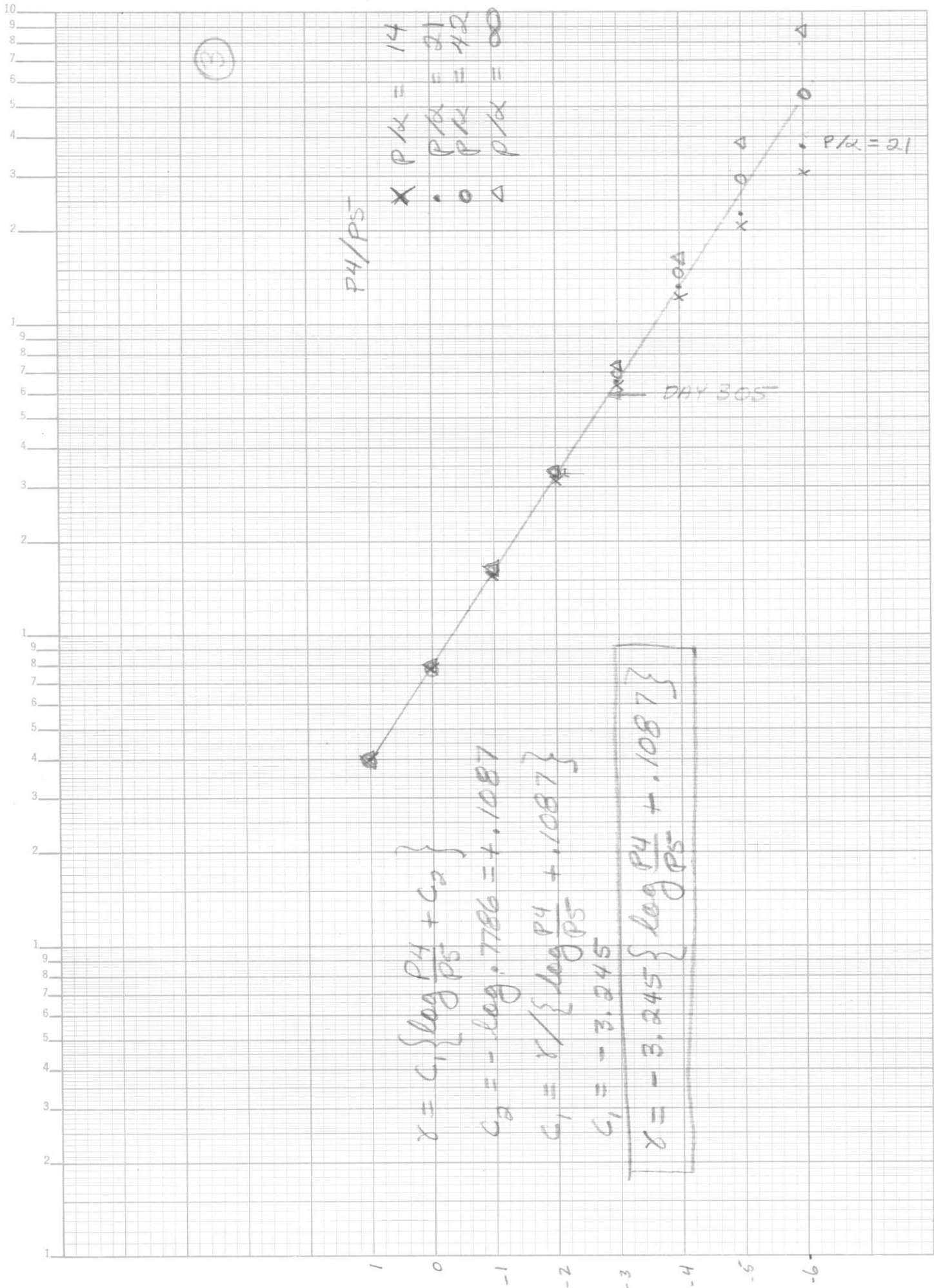
KE SEMI-LOGARITHMIC 46 6290
5 CYCLES X 72 DIVISIONS
MADE IN U.S.A.
KEUFFEL & ESSER CO.





10.
 1. P1/P2
 .1
 .01



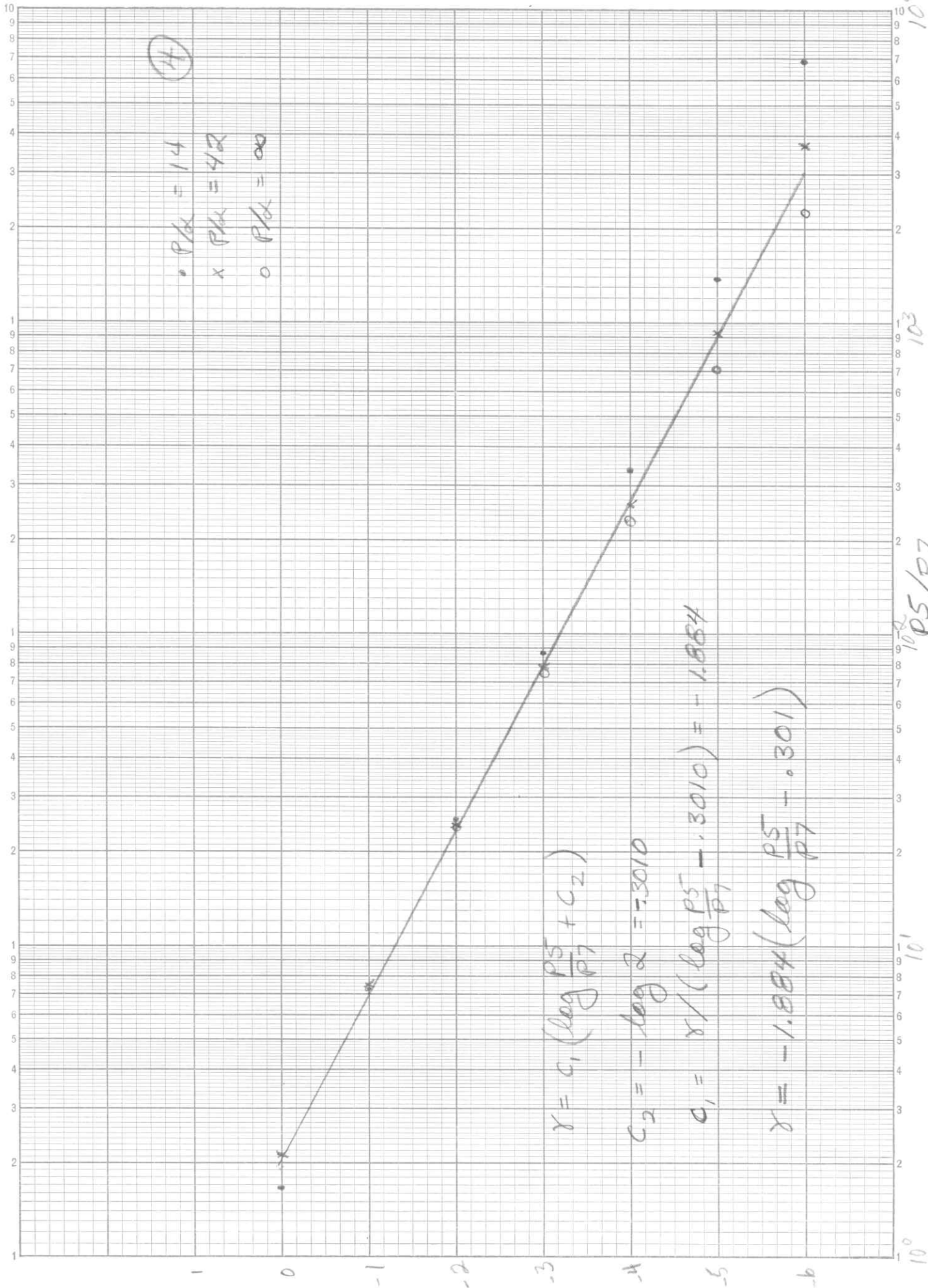


10.

P4/P5

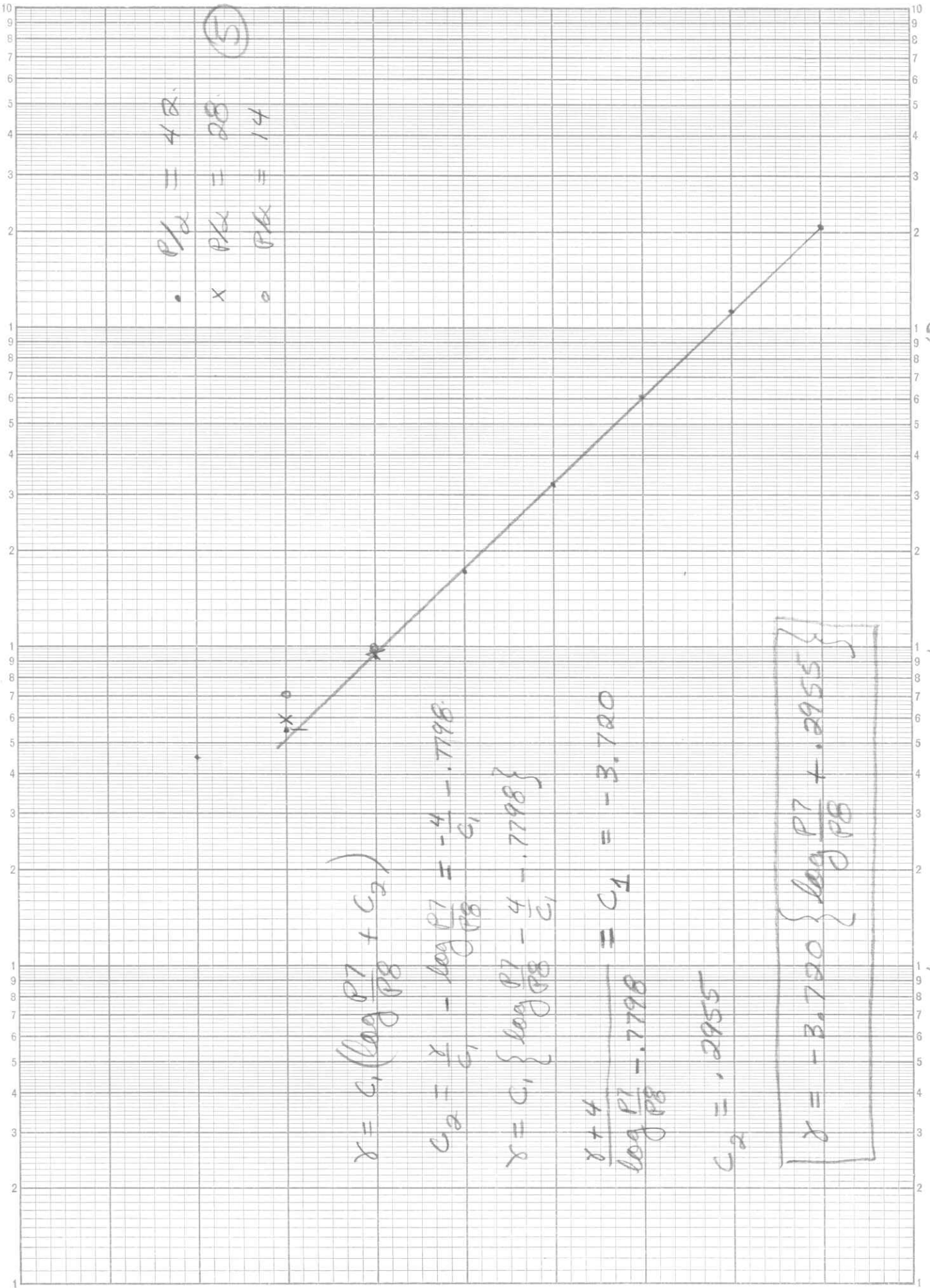
1.

1.



• $P/A = 42$
 x $P/A = 28$
 o $P/A = 14$

(5)



$P7/P8$

$$y = C_1 \left(\log \frac{P7}{P8} + C_2 \right)$$

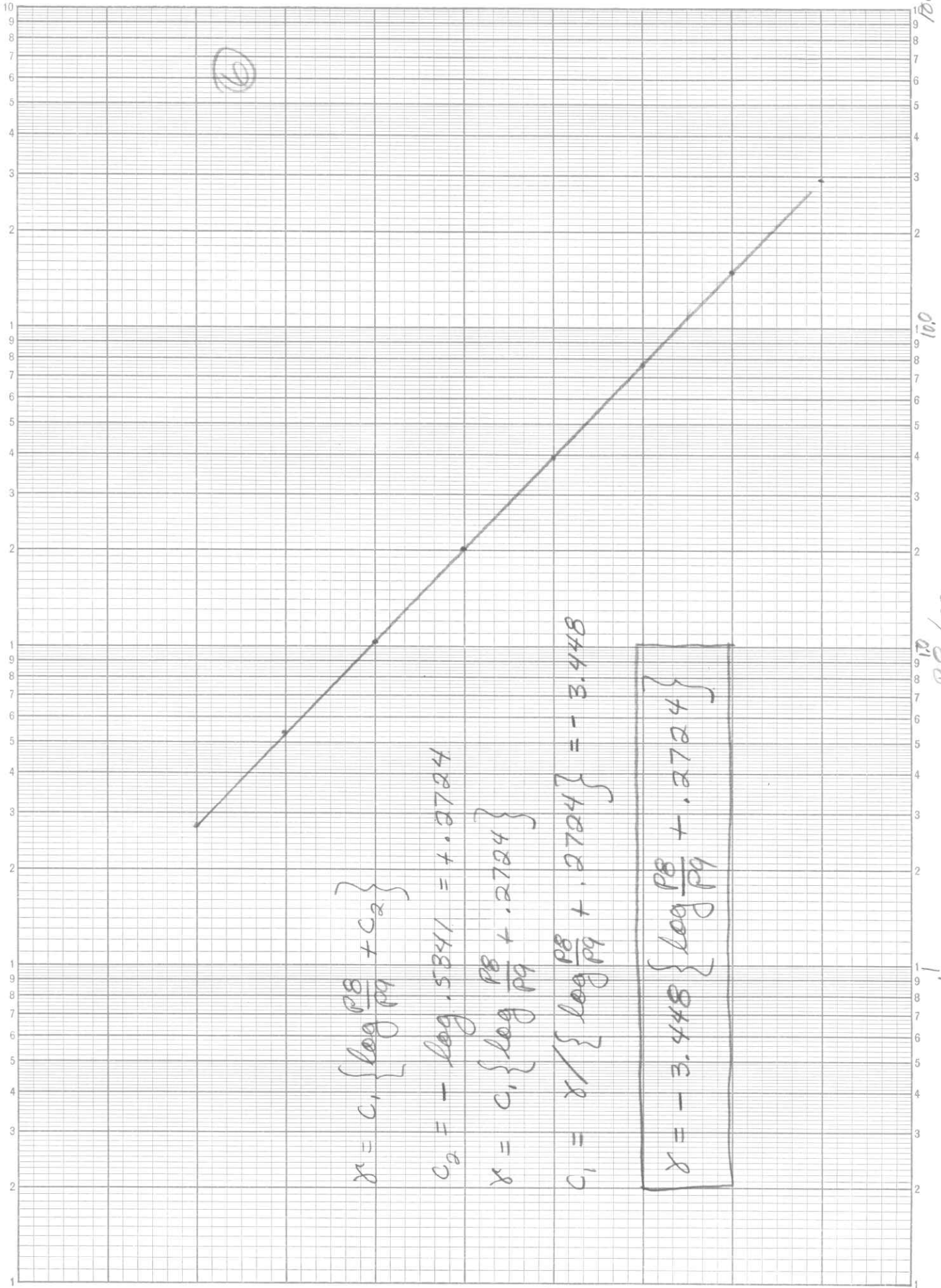
$$C_2 = \frac{y}{C_1} - \log \frac{P7}{P8} = \frac{-4}{C_1} - .7798$$

$$y = C_1 \left\{ \log \frac{P7}{P8} - \frac{4}{C_1} - .7798 \right\}$$

$$\frac{y + 4}{\log \frac{P7}{P8} - .7798} = C_1 = -3.720$$

$$C_2 = .2955$$

$$y = -3.720 \left\{ \log \frac{P7}{P8} + .2955 \right\}$$



(6)

$$y = c_1 \left\{ \log \frac{P_8}{P_9} + c_2 \right\}$$

$$c_2 = -\log .5841 = +.2724$$

$$y = c_1 \left\{ \log \frac{P_8}{P_9} + .2724 \right\}$$

$$c_1 = y / \left\{ \log \frac{P_8}{P_9} + .2724 \right\} = -3.448$$

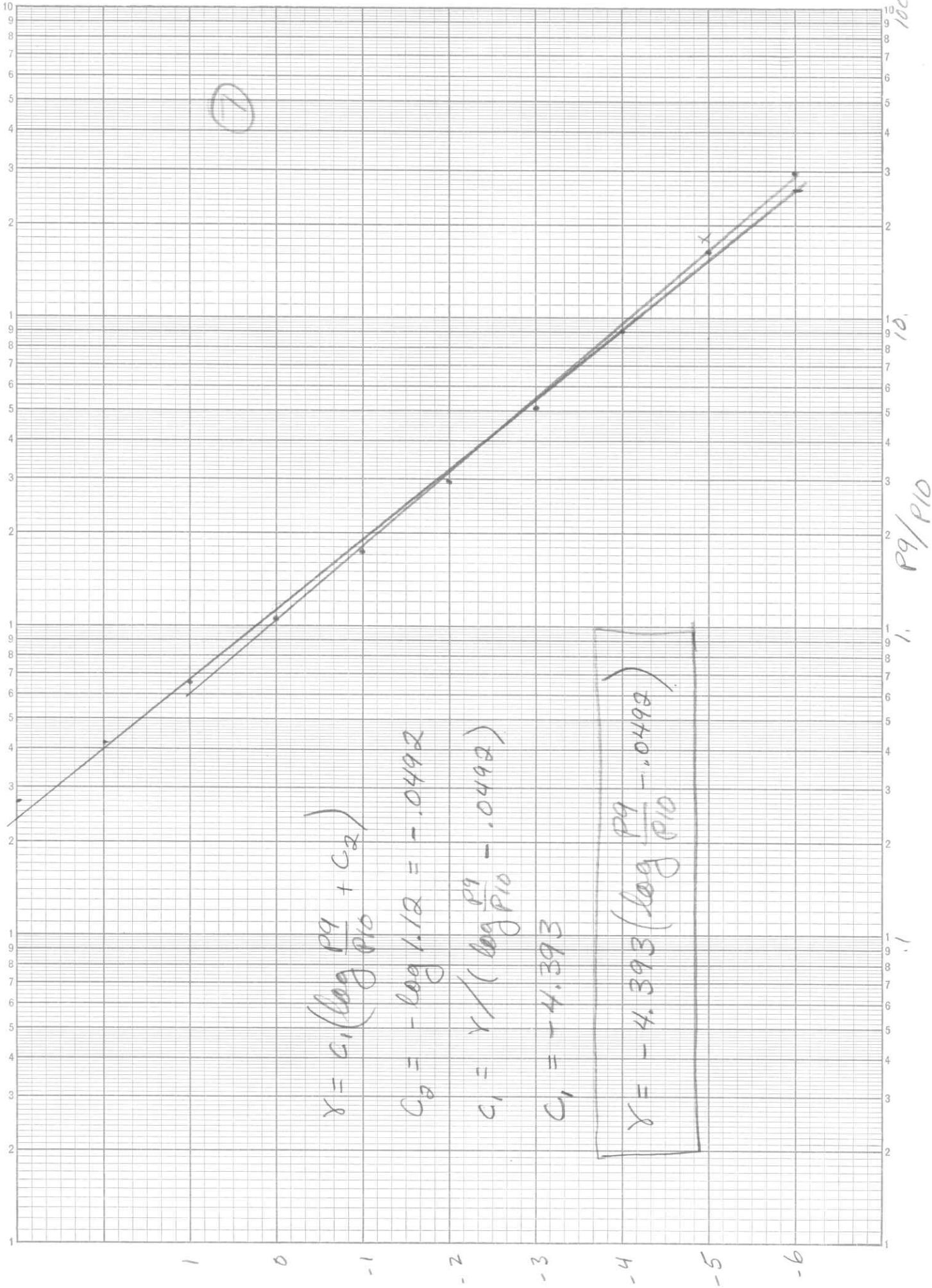
$$y = -3.448 \left\{ \log \frac{P_8}{P_9} + .2724 \right\}$$

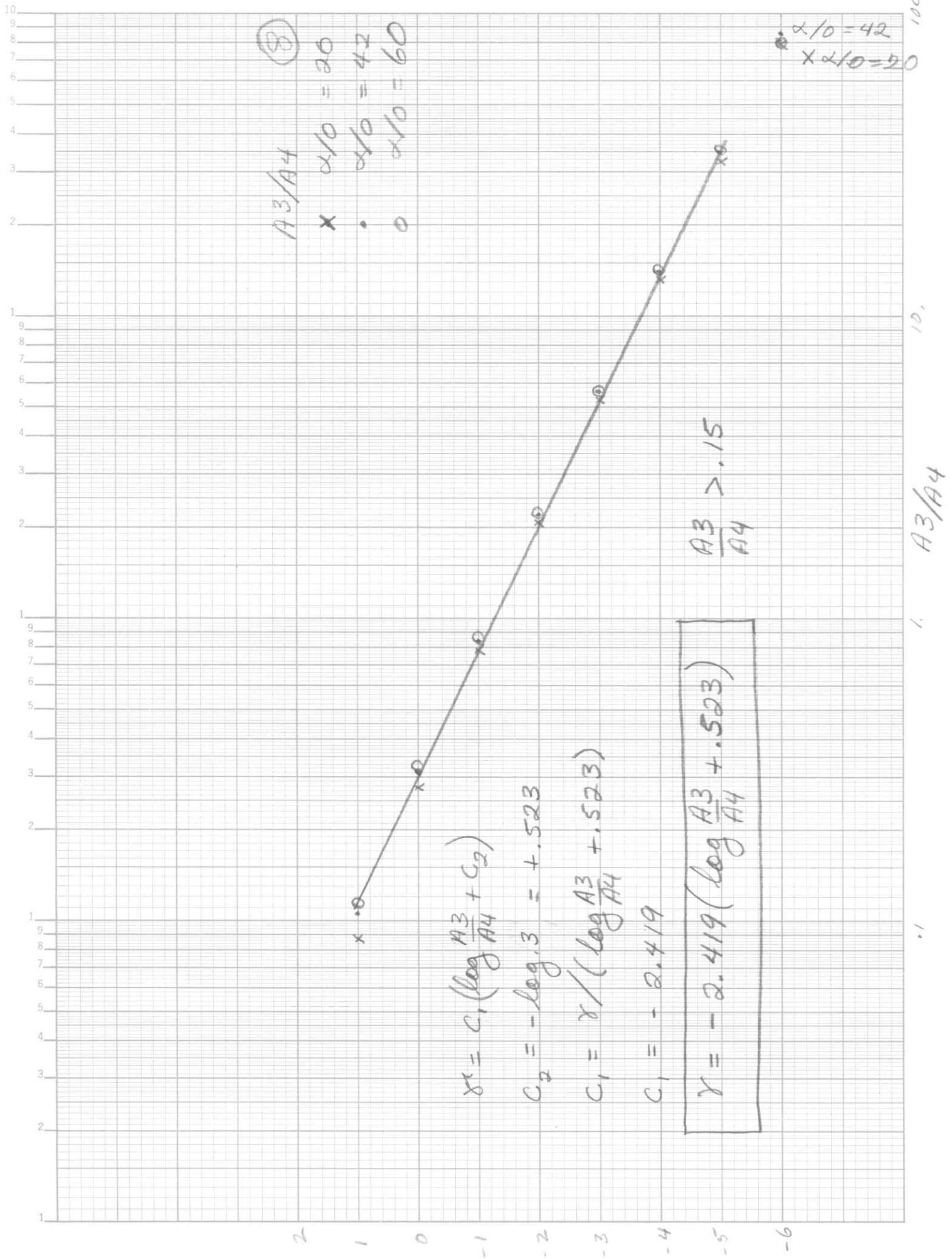
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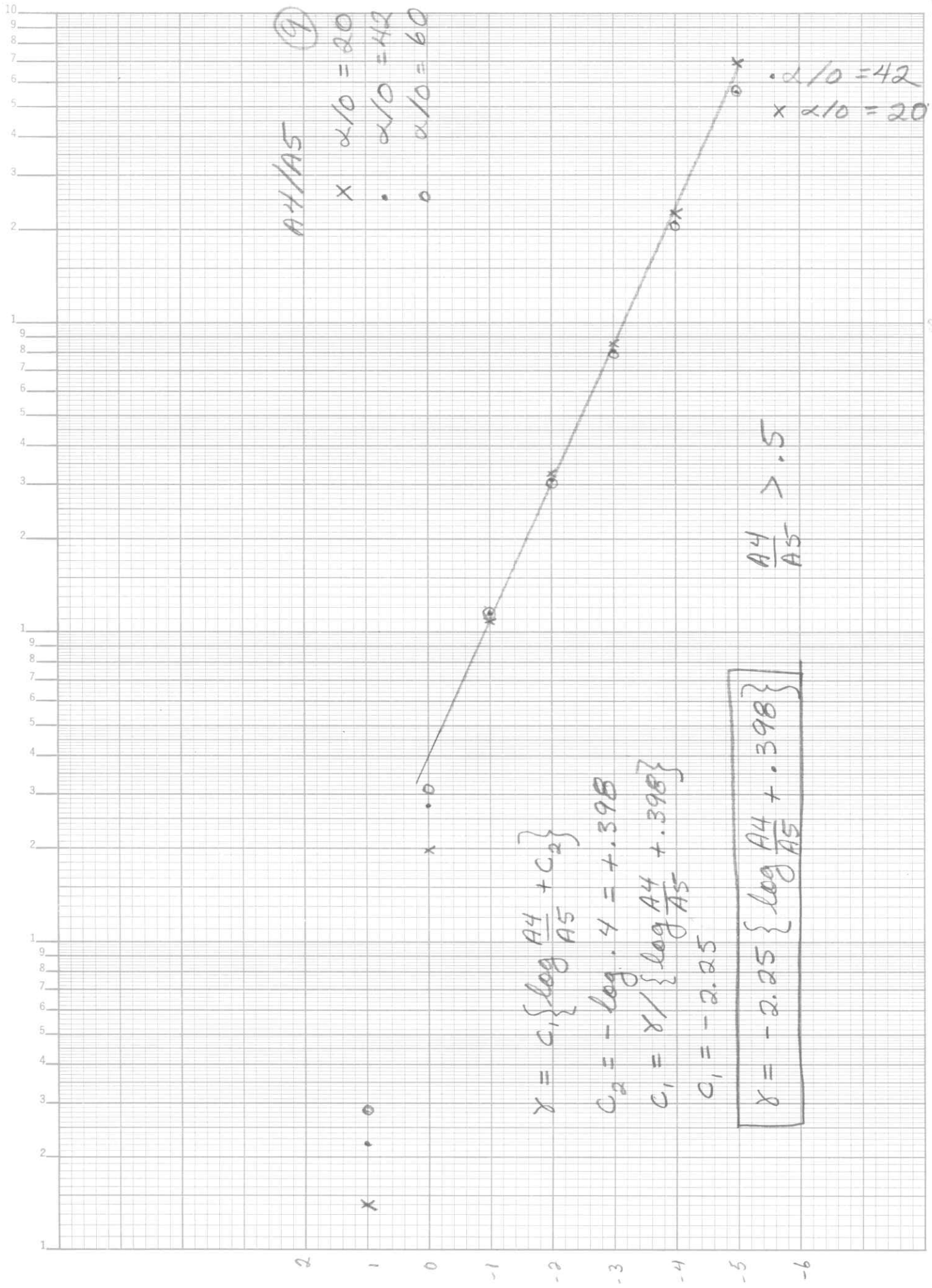
10.0

$\frac{P_8}{P_9}$

1







$A4/A5$ (9)
 $x \quad x/0 = 20$
 $\bullet \quad x/0 = 42$
 $o \quad x/0 = 60$

$x/0 = 42$
 $x \quad x/0 = 20$

$\frac{A4}{A5} > .5$

$$y = c_1 \left\{ \log \frac{A4}{A5} + c_2 \right\}$$

$$c_2 = -\log .4 = +.398$$

$$c_1 = \gamma / \left\{ \log \frac{A4}{A5} + .398 \right\}$$

$$c_1 = -2.25$$

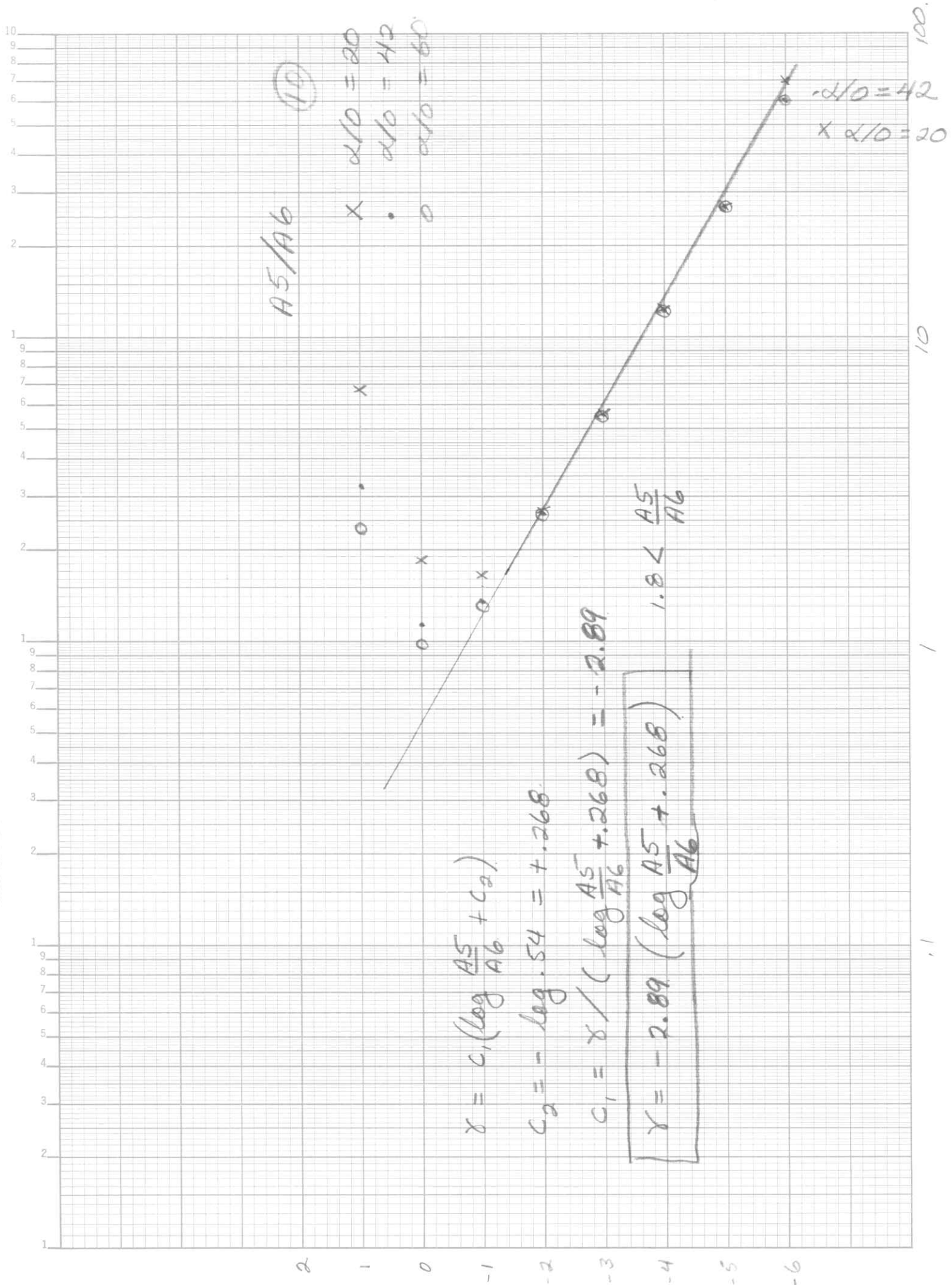
$$\gamma = -2.25 \left\{ \log \frac{A4}{A5} + .398 \right\}$$

100.

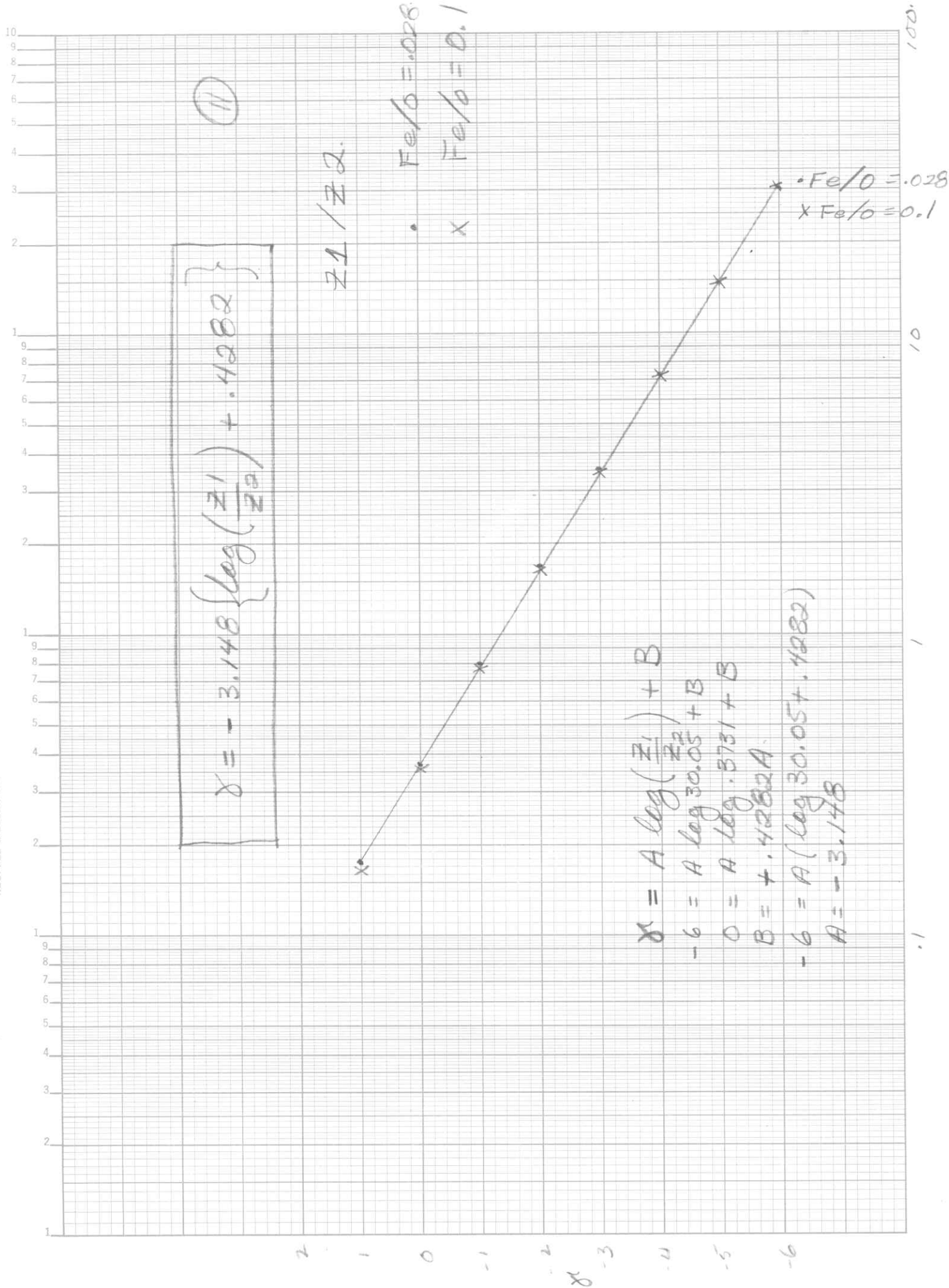
10.

$A4/A5$

1



100.
10
1
1



$$a = 0.0448 \frac{P}{\alpha} - 0.0232$$

$$a = C_1 \frac{P}{\alpha} + C_2 \quad (12)$$

$$.604 = 14C_1 + C_2$$

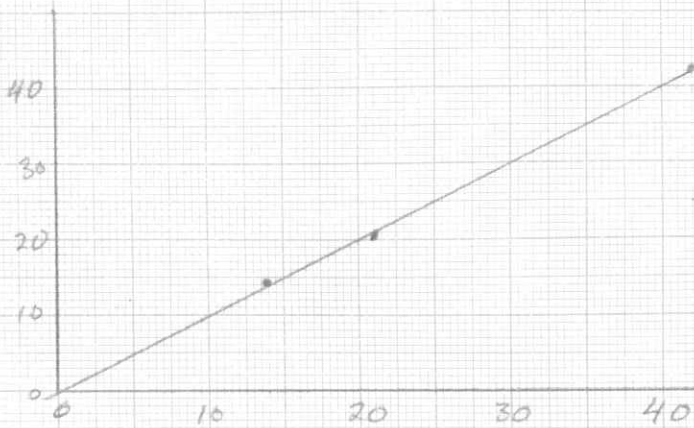
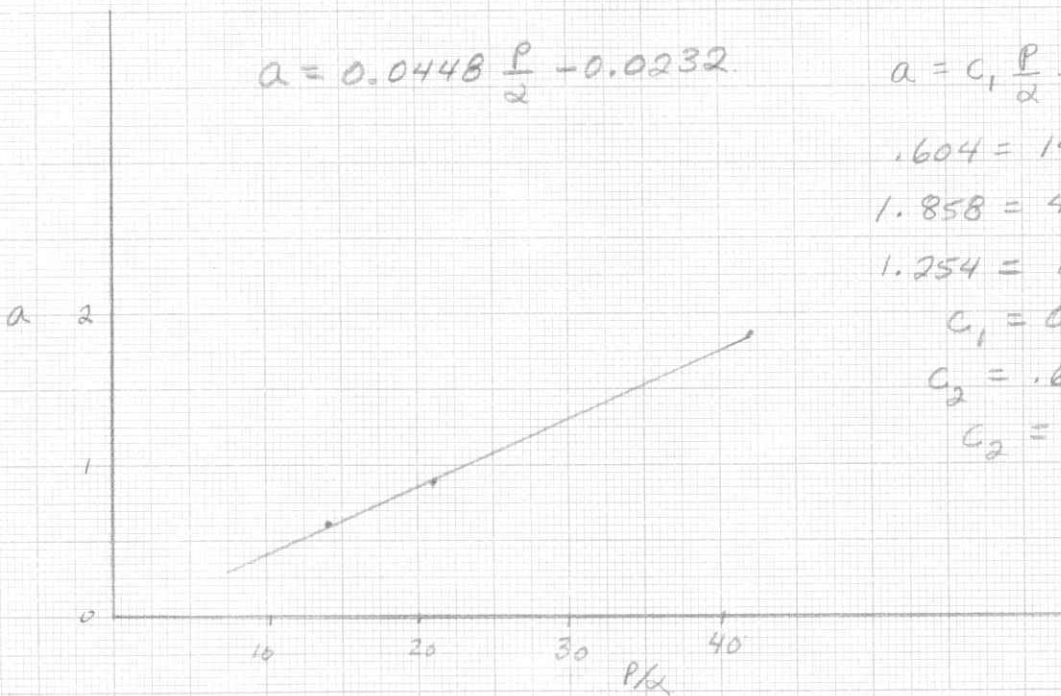
$$1.858 = 42C_1 + C_2$$

$$1.254 = 28C_1$$

$$C_1 = 0.0448$$

$$C_2 = .604 - 14 \cdot .0448$$

$$C_2 = -0.0232$$



$$b = C_1 \frac{P}{\alpha} + C_2$$

$$14.53 = C_1 \cdot 14 + C_2$$

$$42.54 = C_1 \cdot 42 + C_2$$

$$28.01 = 28C_1$$

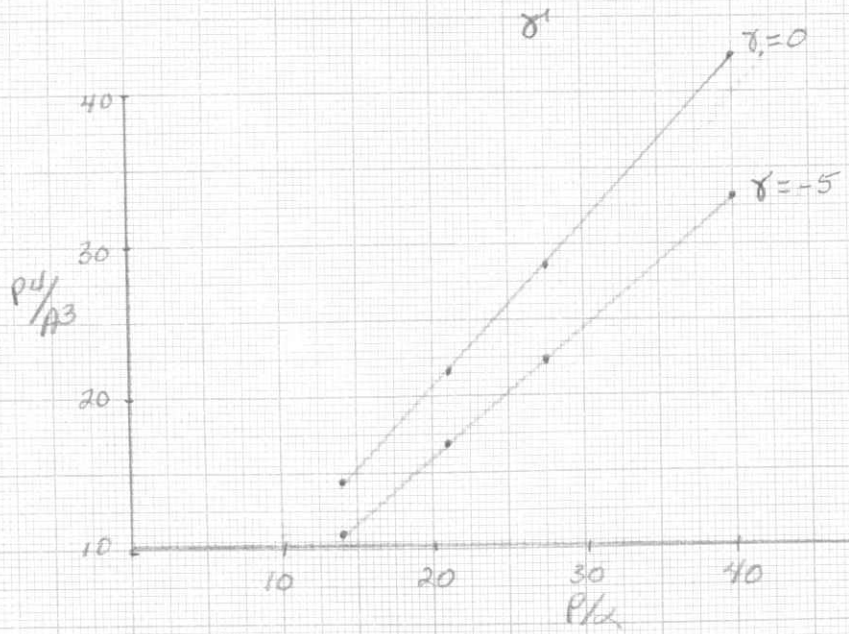
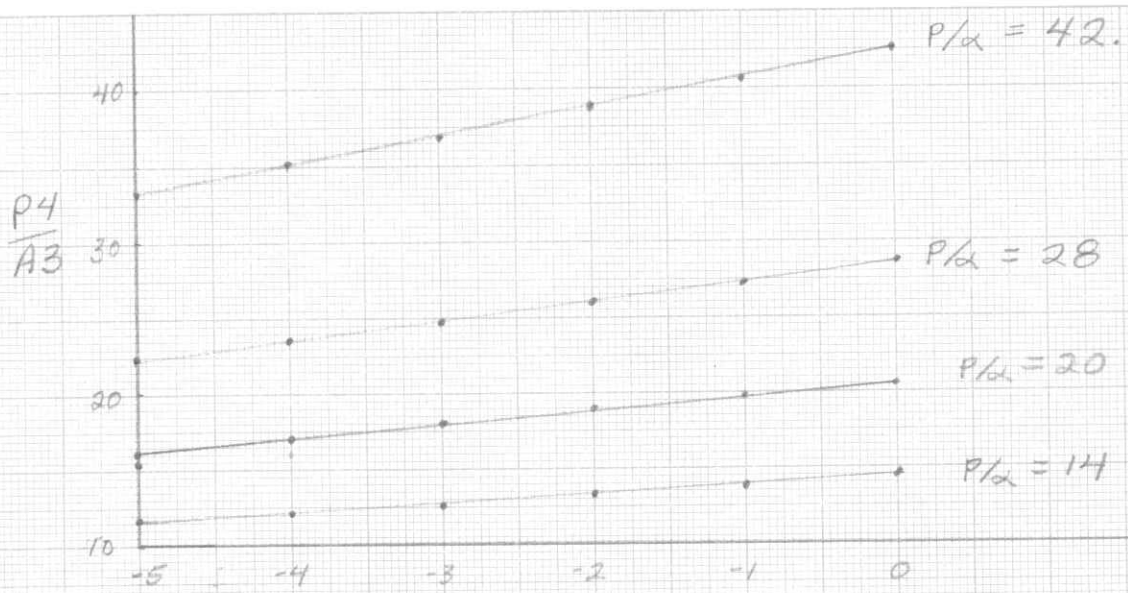
$$C_1 = 1$$

$$C_2 \approx 0$$

$$\frac{P4}{A3} = \gamma \left\{ 0.0448 \frac{P}{\alpha} - 0.0232 \right\} + \frac{P}{\alpha}$$

$$\frac{P4}{A3} + 0.0232\gamma = \frac{P}{\alpha} \left\{ 0.0448\gamma + 1 \right\}$$

$$\boxed{\frac{P}{\alpha} = \frac{\frac{P4}{A3} + 0.0232\gamma}{1 + 0.0448\gamma}}$$



$$\frac{P_4}{A_3} = a\gamma + b$$

$$\frac{P}{A} = 21 \quad b = 20.61$$

$$16.18 = -5a + b$$

$$a = .886$$

$$\frac{P}{A} = 42 \quad b = 42.54$$

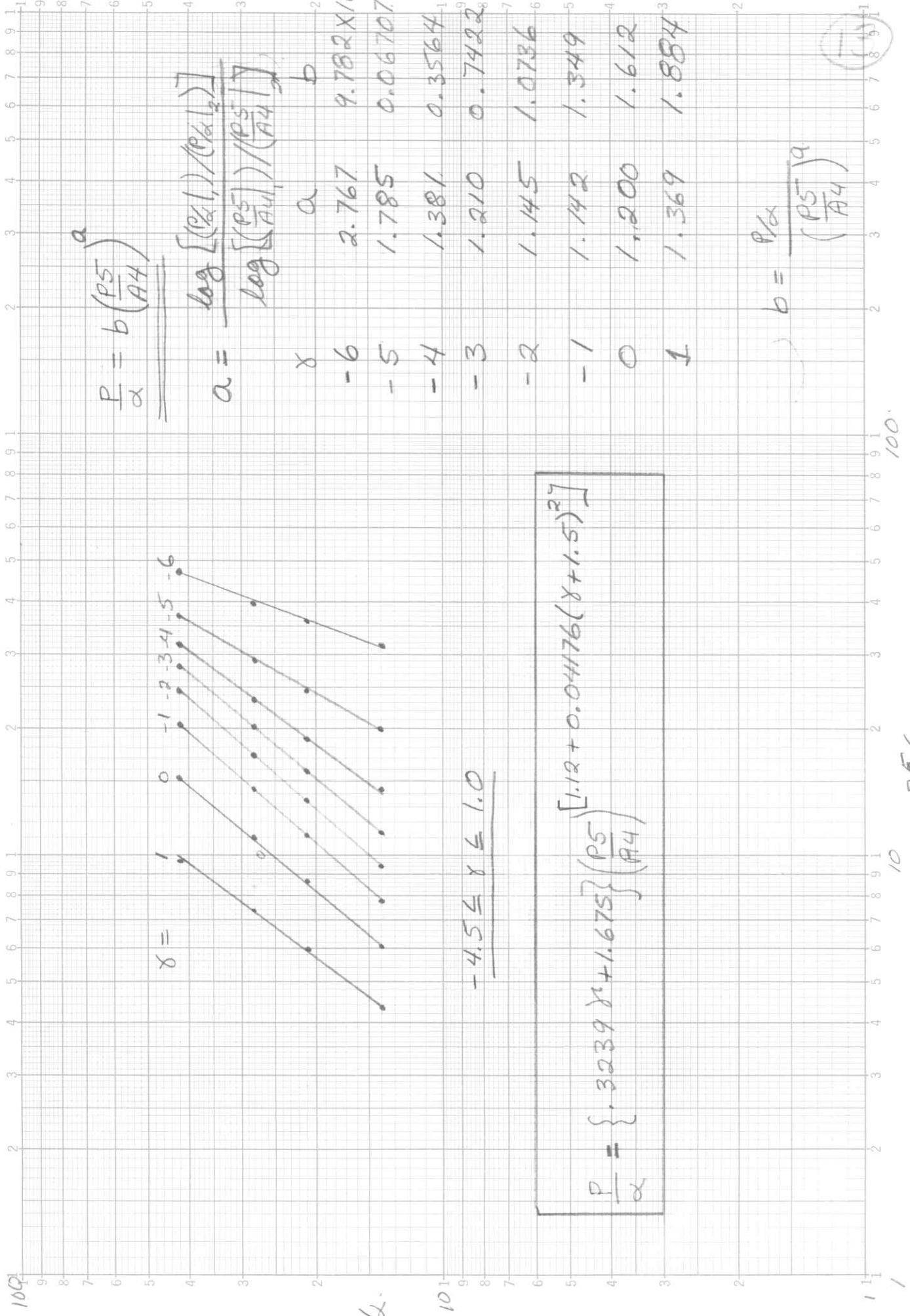
$$33.25 = -5a + 42.54$$

$$a = 1.858$$

$$\frac{P}{A} = 14 \quad b = 14.53$$

$$11.51 = -5a + 14.53$$

$$a = .604$$

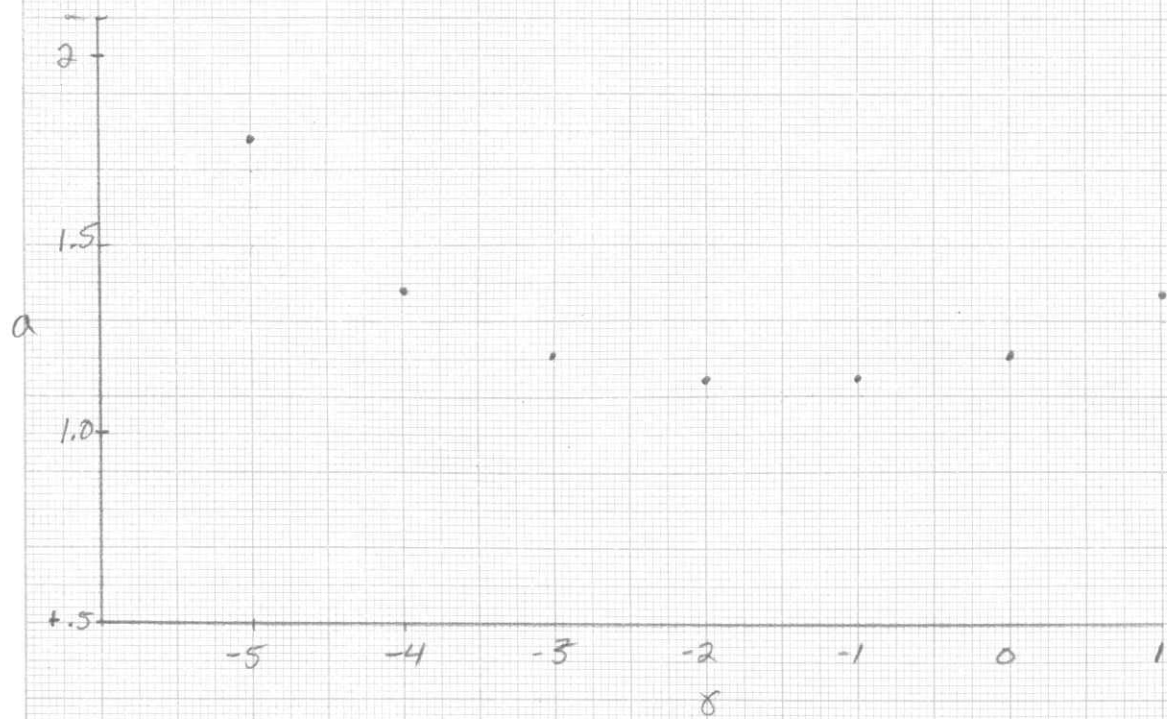
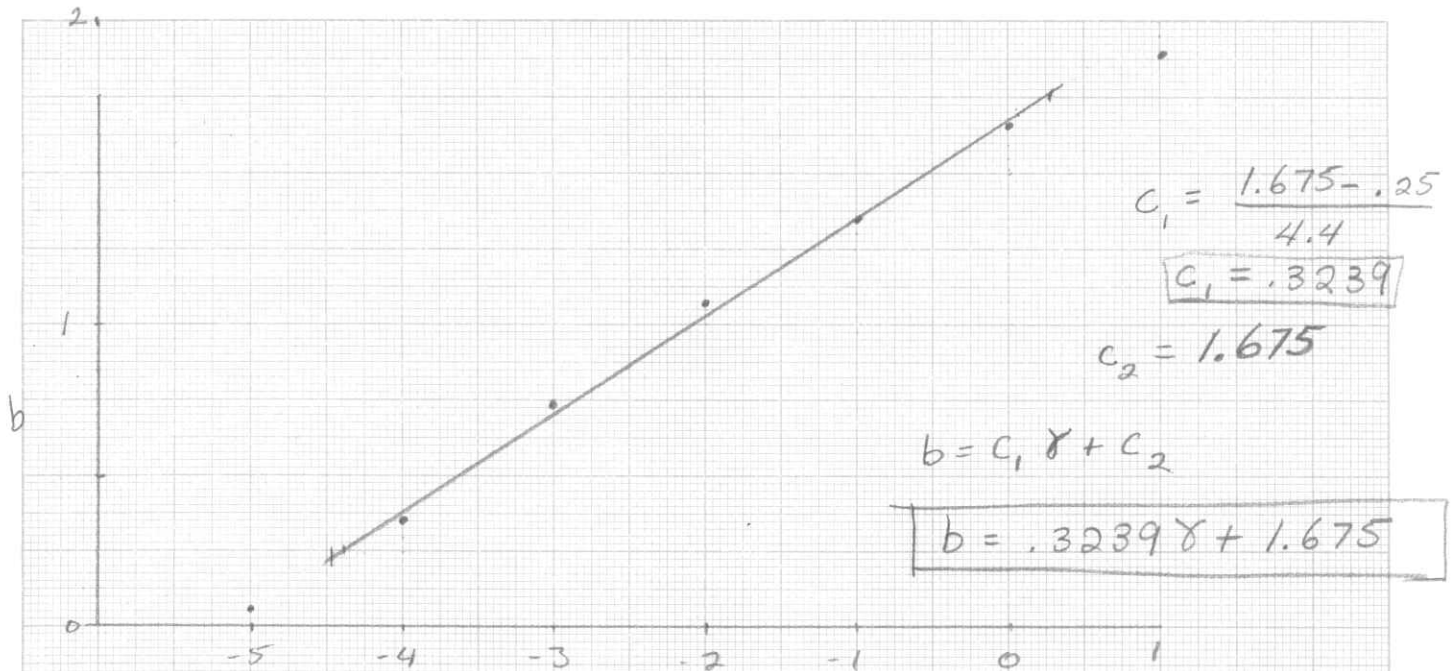


$\frac{P5}{A4}$

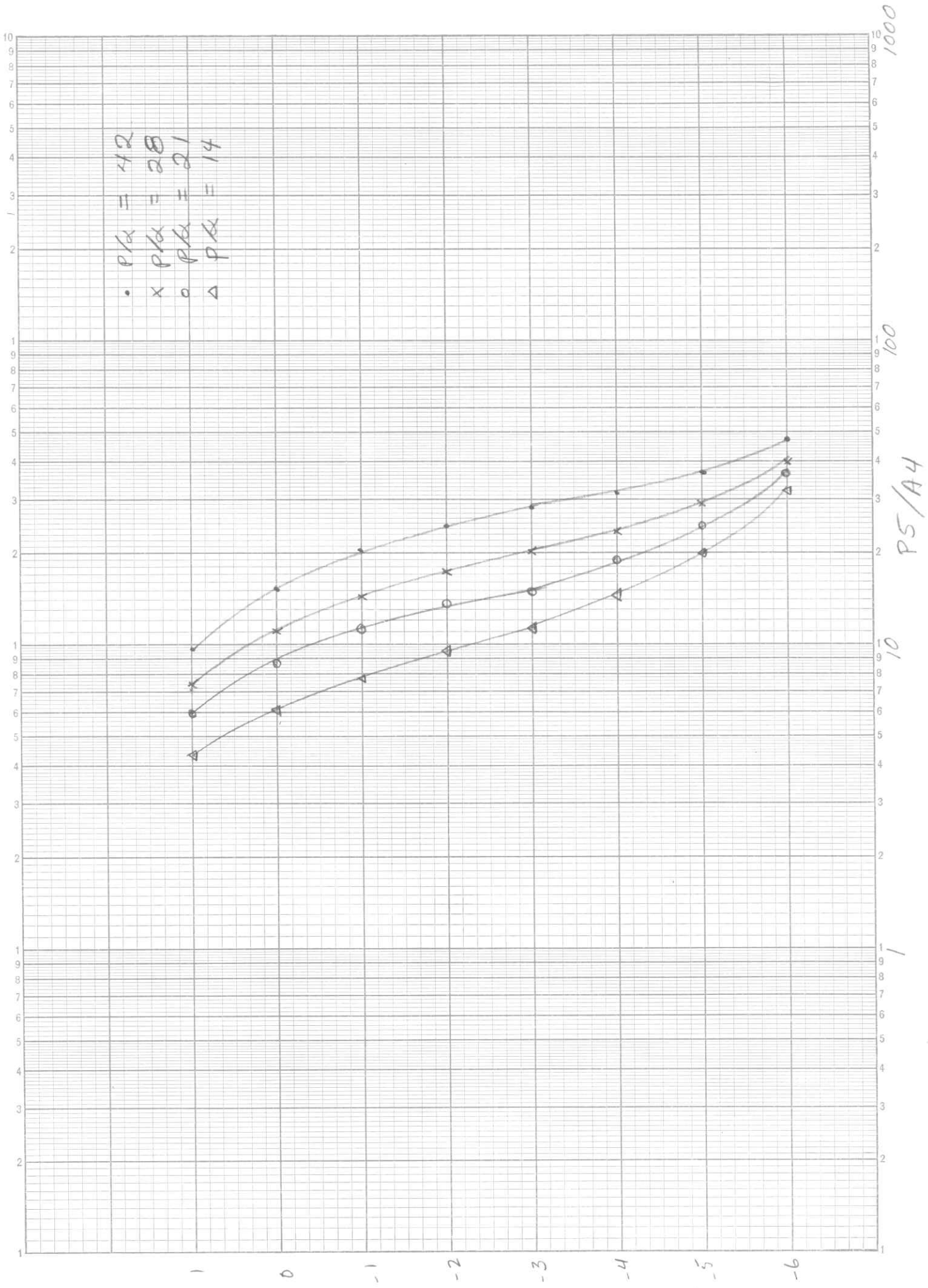
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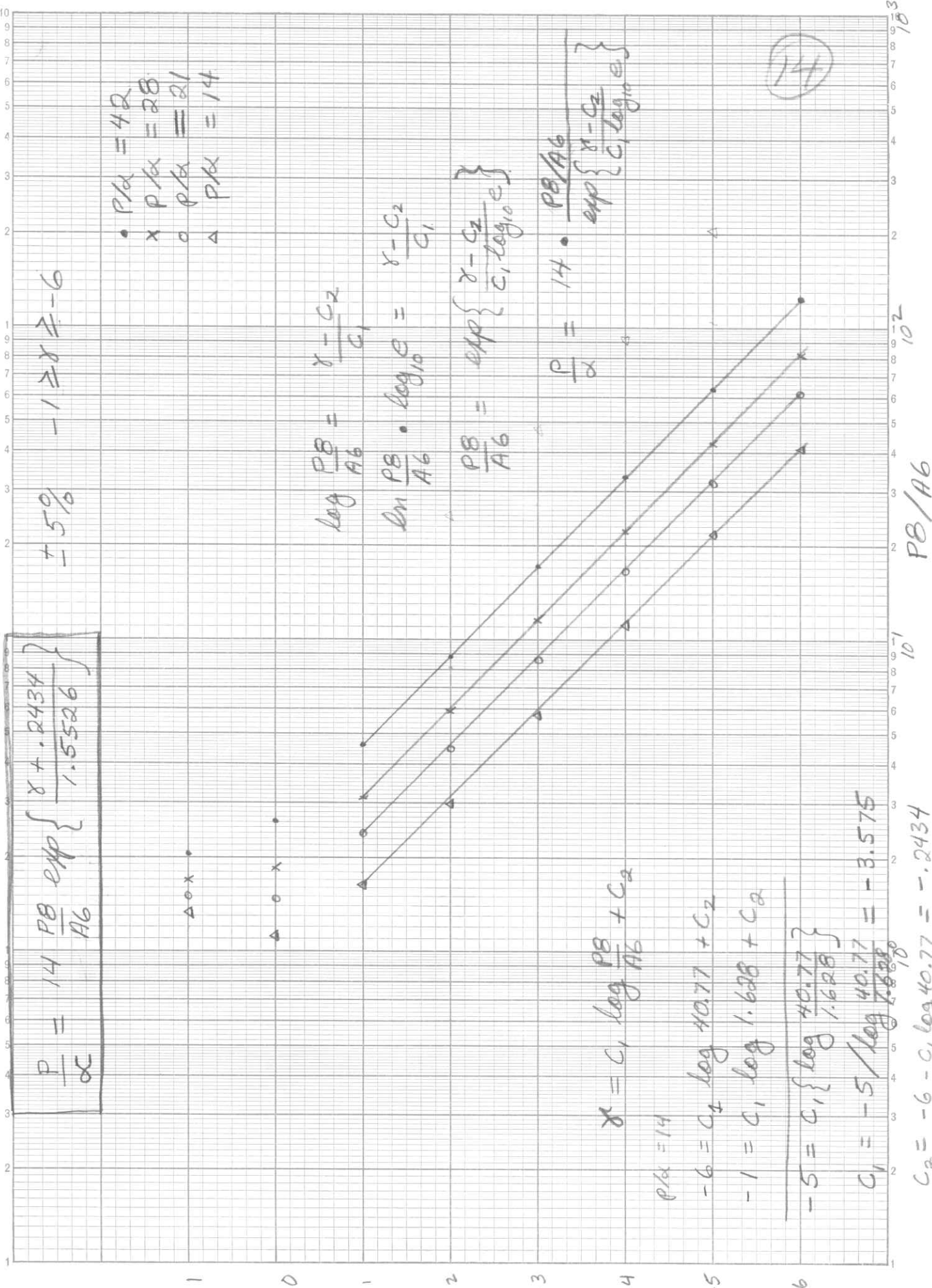
10

7



TRY $a = a_0 + C_1 (x + 1.5)^2$ $a_0 = 1.12$
 $a = 1.12 + C_1 (x + 1.5)^2$
 $x = -4$ $a_1 = 1.381$
 $C_1 = \frac{1.381 - 1.12}{(x + 1.5)^2} = 0.04176$
 $a = 1.12 + 0.04176 (x + 1.5)^2$



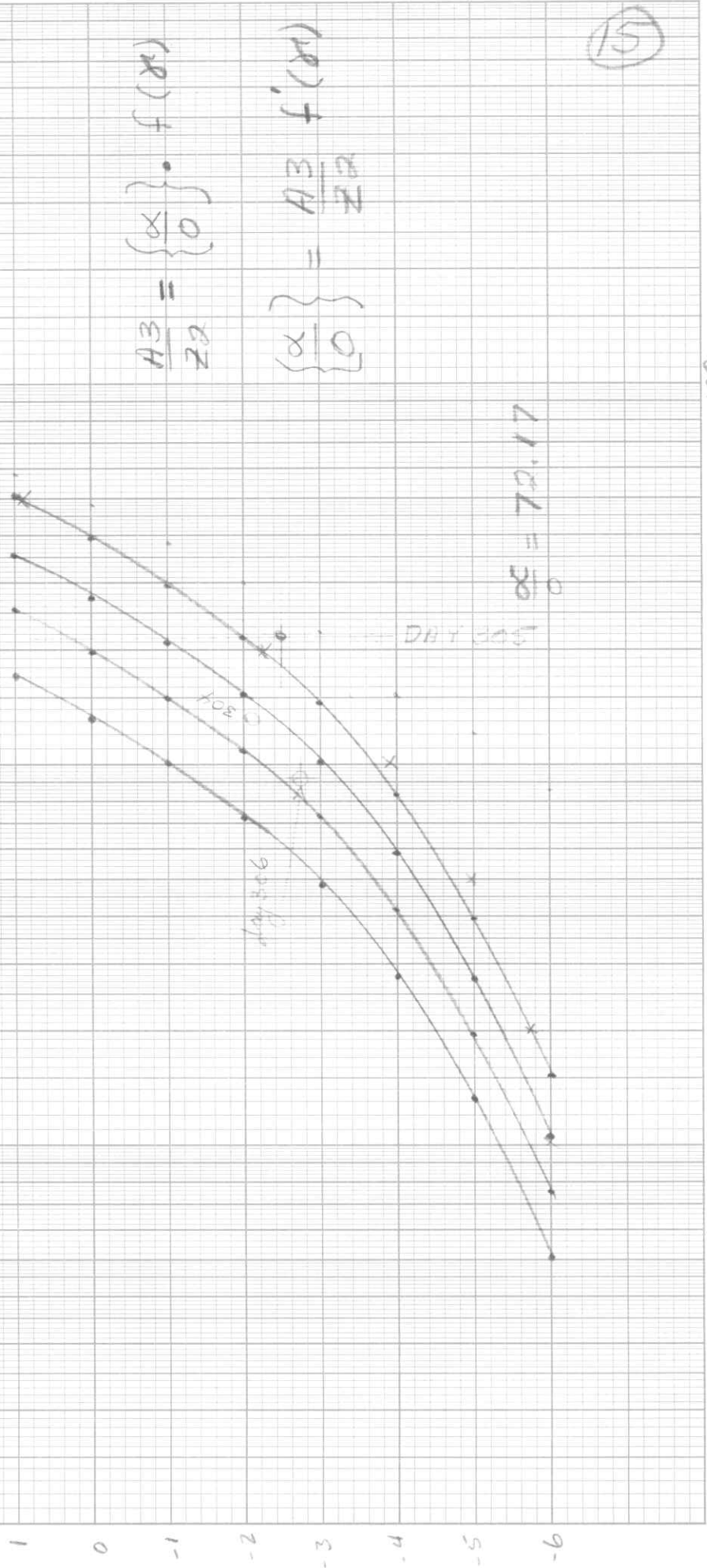


(14)

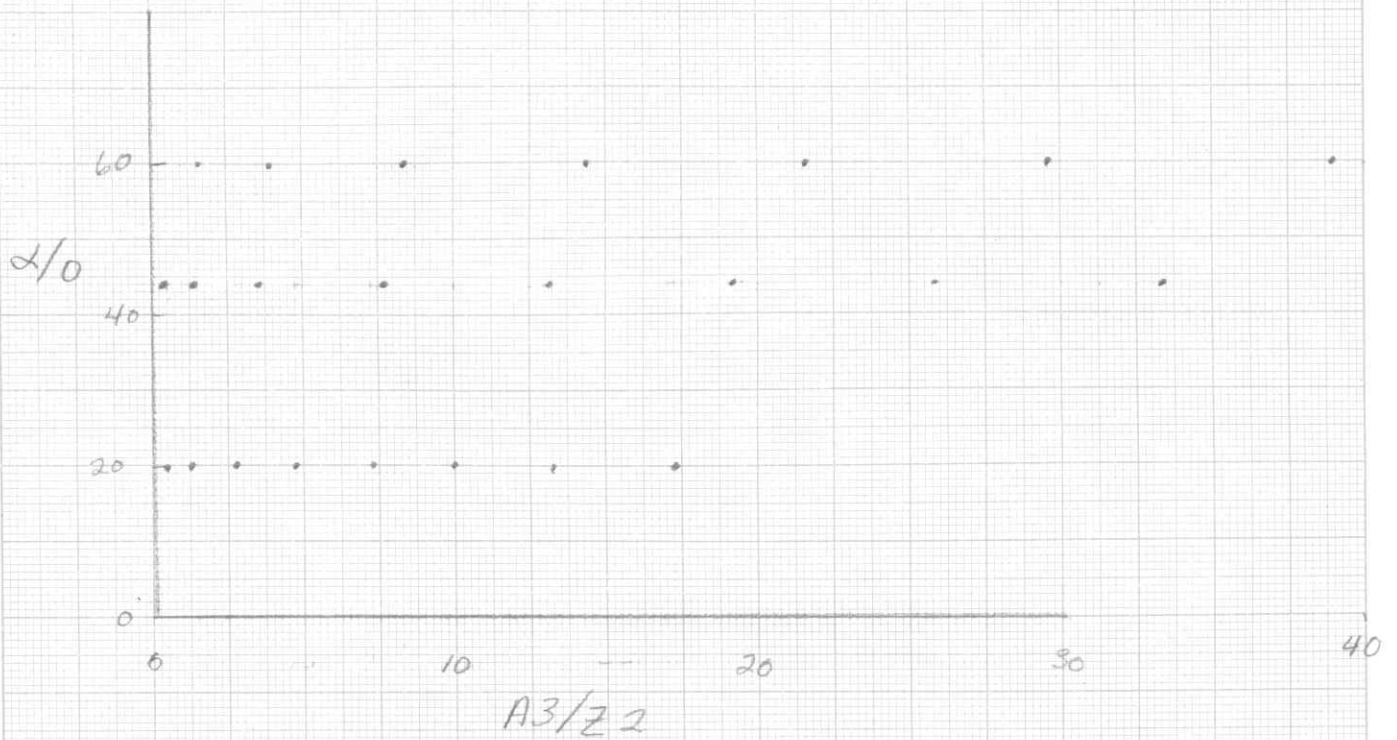
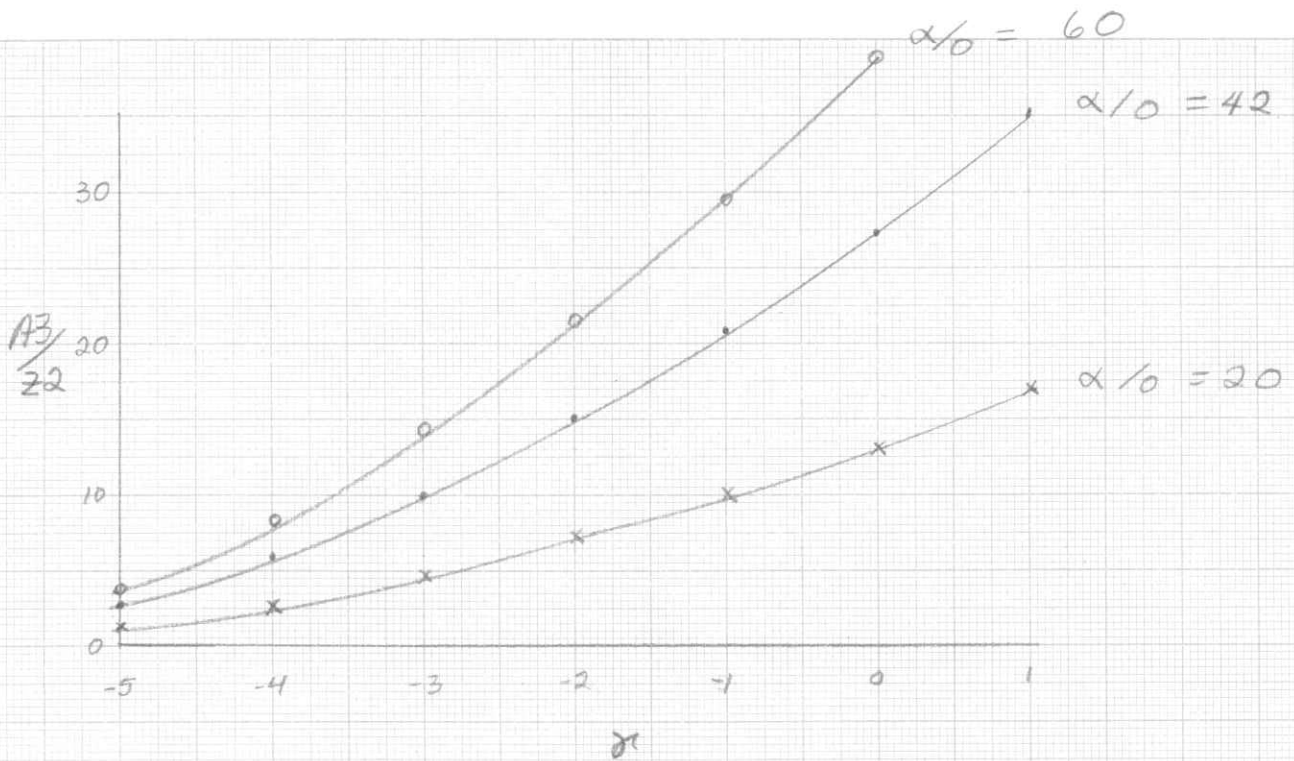
FINAL FIT $\pm 5\%$ $-5.5 < 8 < +1$

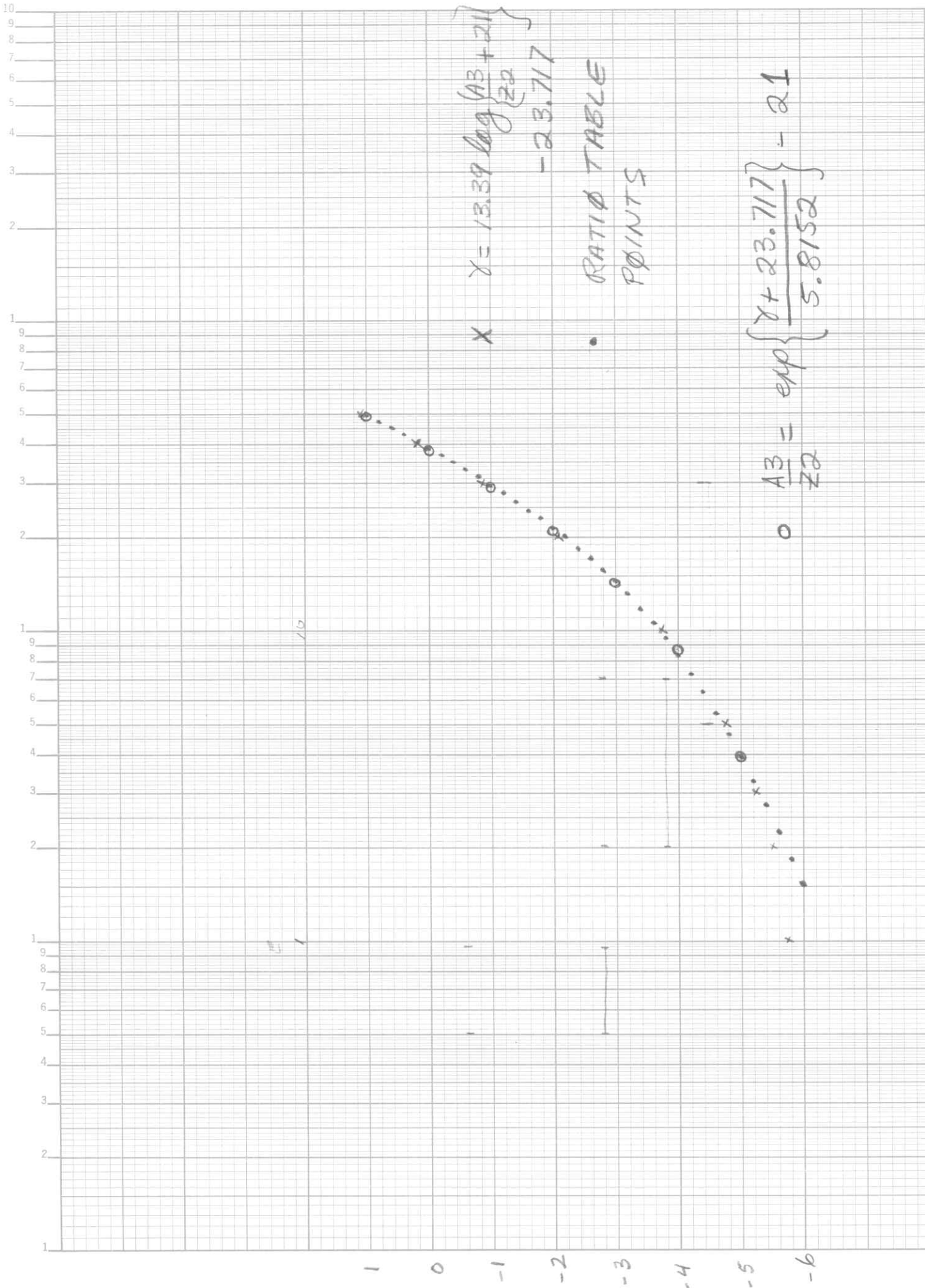
$$\frac{\alpha}{0} = \frac{A3}{22} \cdot \frac{60}{\left[\exp\{ \gamma + 23.717 \} - 21 \right] \cdot 5.8152}$$

$\alpha/0 = 20$
 $\alpha/0 = 30$
 $\alpha/0 = 42$
 $\alpha/0 = 60$



100
10
1
 $A3/22$





$$X = 13.39 \log \left(\frac{A3}{Z2} + 21 \right) - 23.717$$

RATIO TABLE
 POINTS

$$\frac{A3}{Z2} = \exp \left\{ \frac{X + 23.717}{5.8152} \right\} - 21$$

100
 10 A3/Z2