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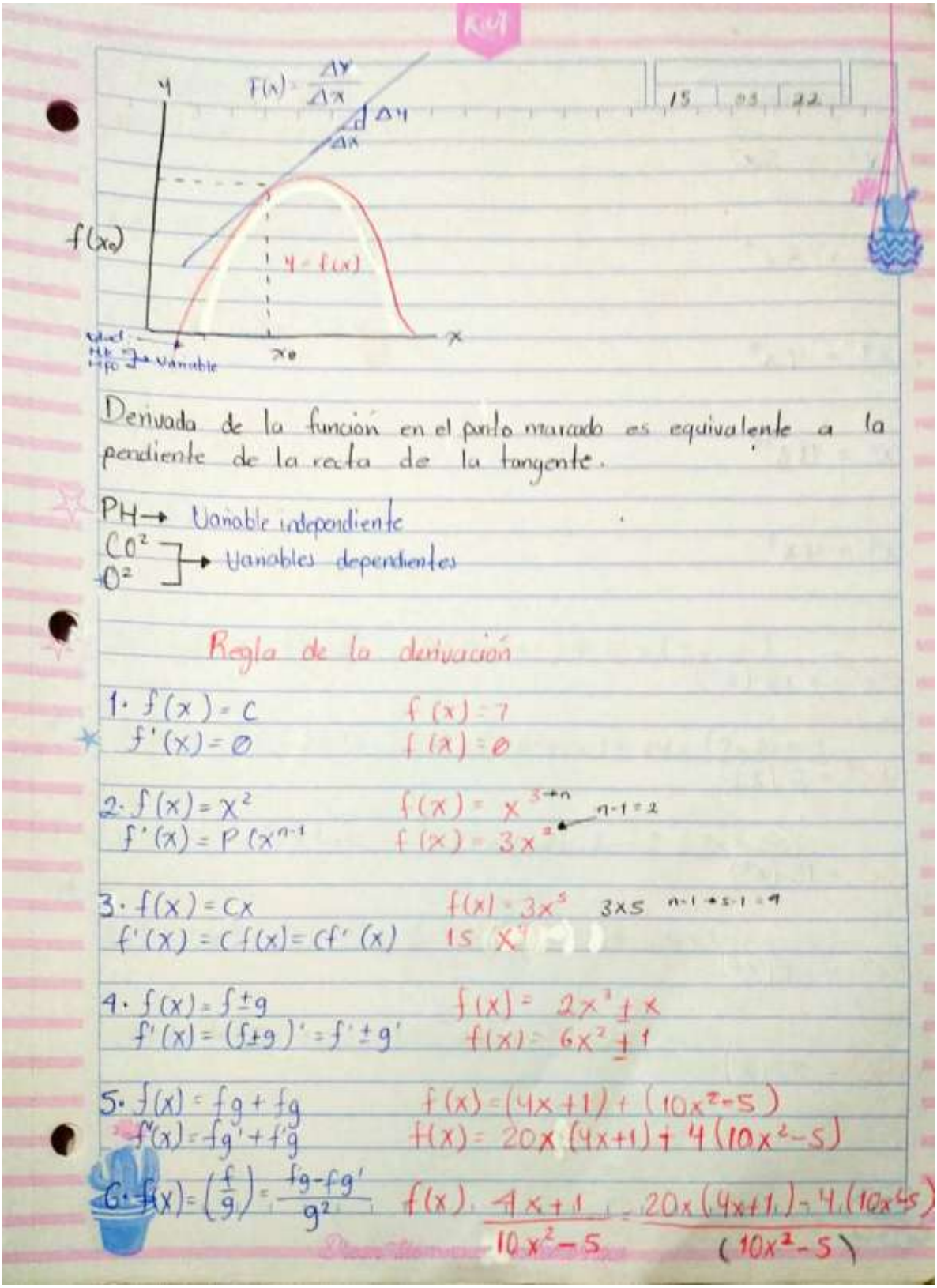
Ejercicios: A seguir derivando

Biomatemáticas

2° “A

Comitán de Domínguez Chiapas a 2 de abril de 2022.



Derivada de la función en el punto marcado es equivalente a la pendiente de la recta de la tangente.

PH → Variable independiente
CO^2, O^2 → Variables dependientes

Regla de la derivación

1. $f(x) = c$ → $f(x) = 7$
   $f'(x) = 0$ → $f(x) = 0$

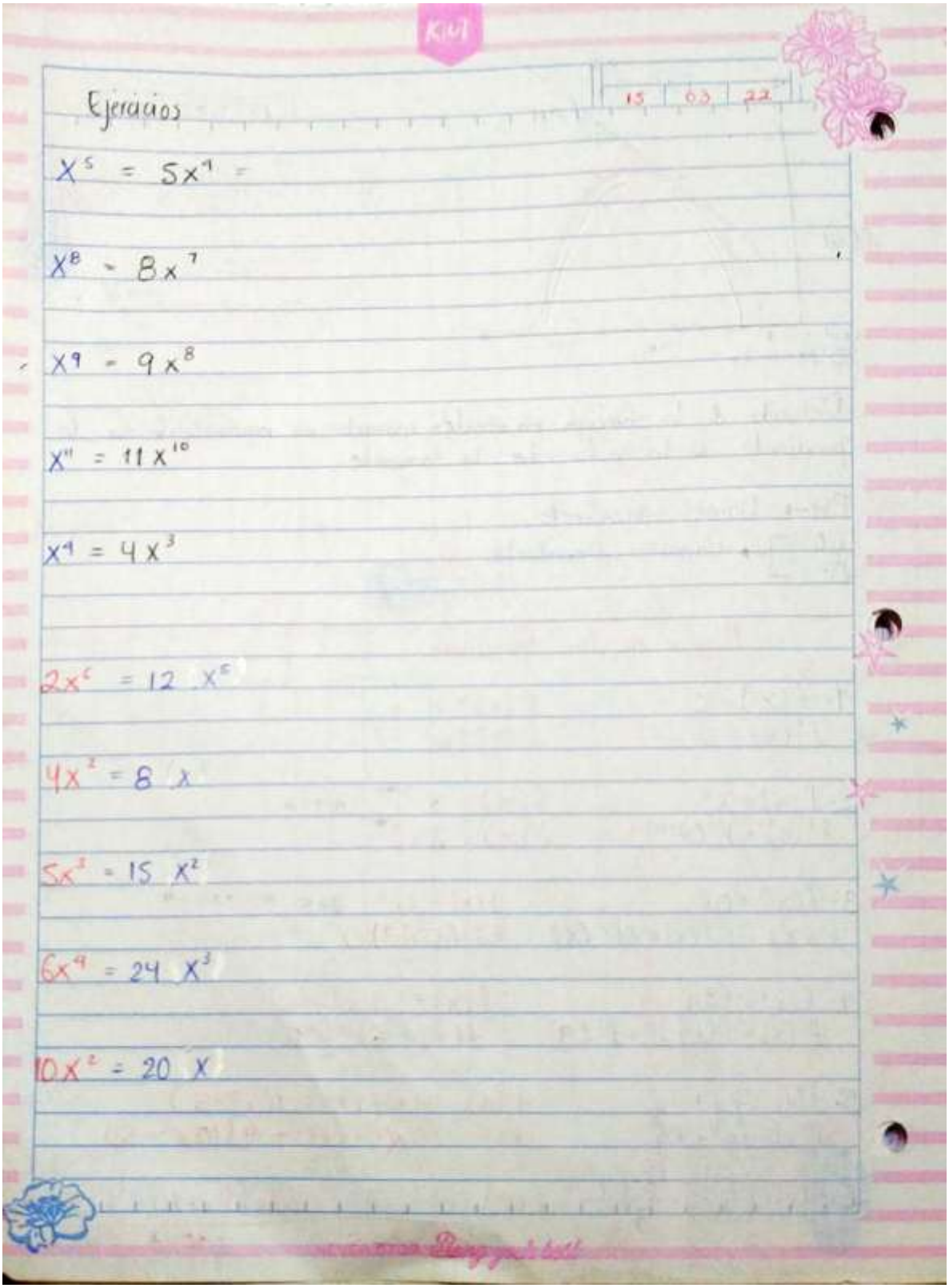
2. $f(x) = x^2$ → $f(x) = x^{3 \to n}$, $n-1 = 2$
   $f'(x) = P(x^{n-1})$ → $f(x) = 3x^2$

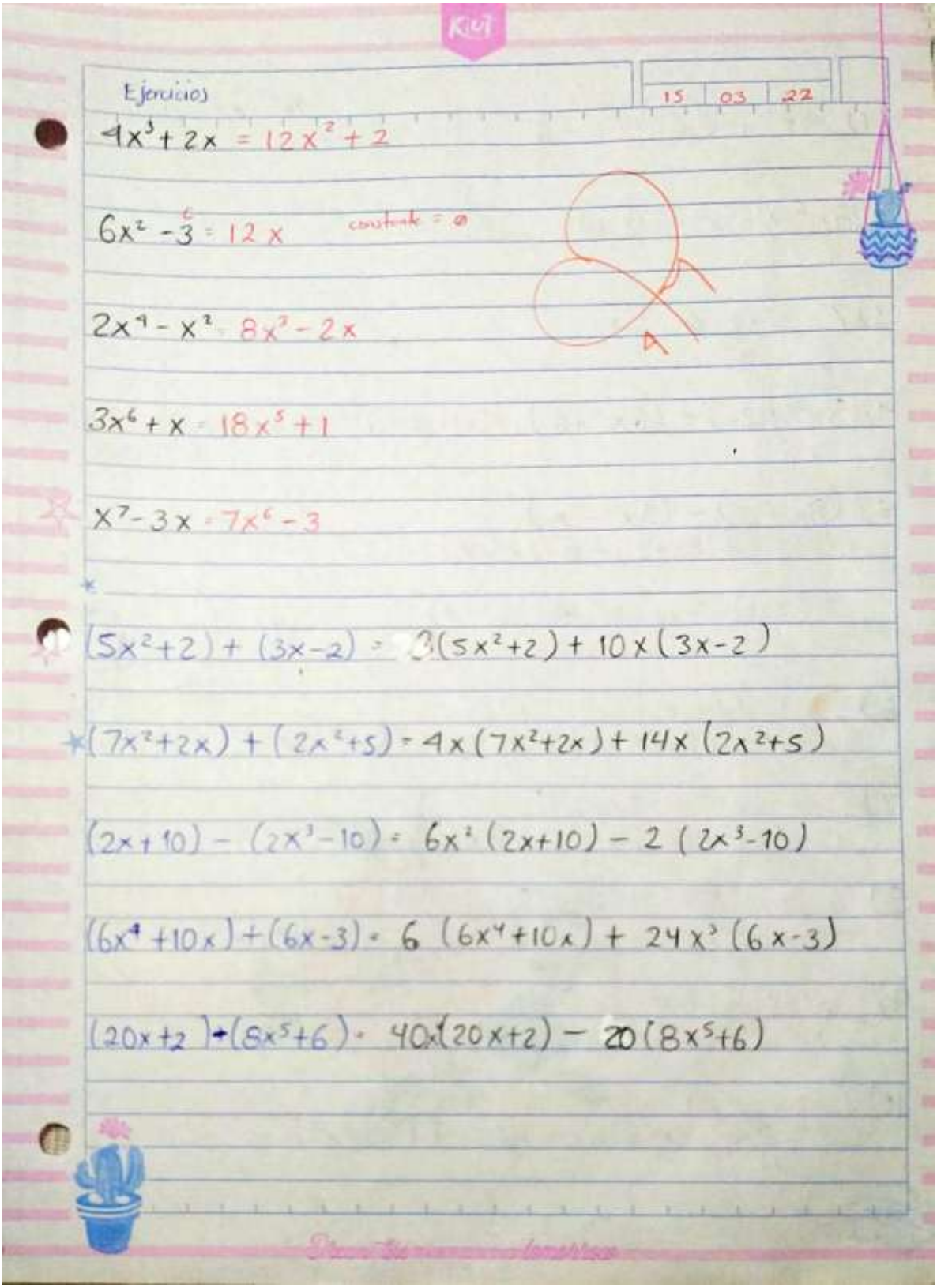
3. $f(x) = cx$ → $f(x) = 3x^5$ 3×5 $n-1 \to 5-1 = 4$
   $f'(x) = c f(x) = c f'(x)$ → $15\ x^4$

4. $f(x) = f \pm g$ → $f(x) = 2x^3 \pm x$
   $f'(x) = (f \pm g)' = f' \pm g'$ → $f(x) = 6x^2 \pm 1$

5. $f(x) = fg + fg$ → $f(x) = (4x+1) + (10x^2 - 5)$
   $f'(x) = fg' + f'g$ → $H(x) = 20x(4x+1) + 4(10x^2 - 5)$

6. $f(x) = \left(\frac{f}{g}\right) = \frac{fg - fg'}{g^2}$ → $f(x) = \frac{4x+1}{10x^2-5} = \frac{20x(4x+1) - 4(10x^2-5)}{(10x^2-5)}$


Ejercicios
15 03 22
$X^5 = 5x^4 =$
$X^8 = 8x^7$
$X^9 = 9x^8$
$X^{11} = 11x^{10}$
$x^4 = 4x^3$
$2x^6 = 12\ x^5$
$4x^2 = 8\ x$
$5x^3 = 15\ x^2$
$6x^4 = 24\ x^3$
$10x^2 = 20\ x$



Ejercicios

15 03 22

$4x^3 + 2x = 12x^2 + 2$

$6x^2 - 3 = 12x$ constante = 0

$2x^4 - x^2 = 8x^3 - 2x$

$3x^6 + x = 18x^5 + 1$

$x^7 - 3x = 7x^6 - 3$

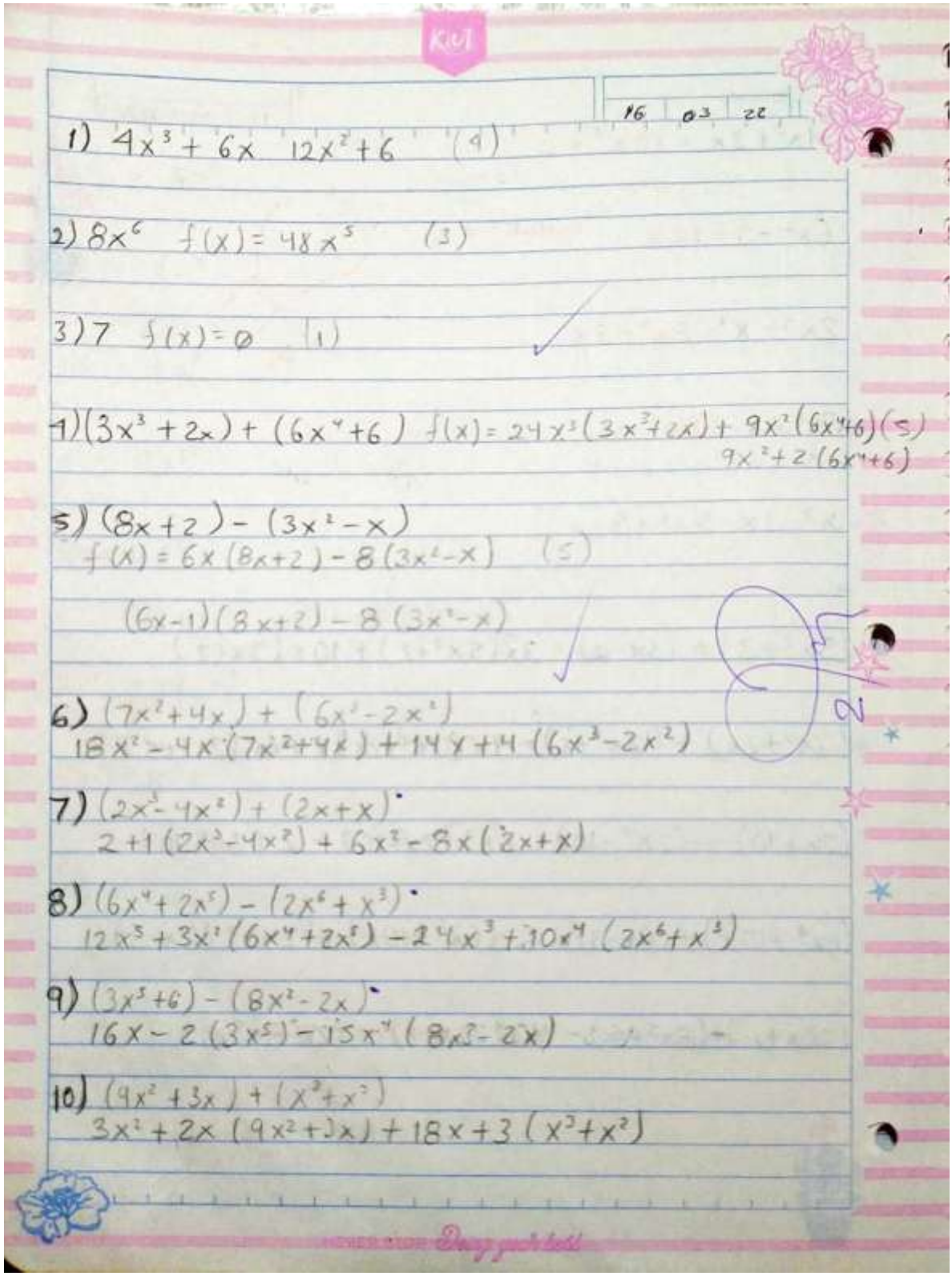
$(5x^2+2) + (3x-2) = 3(5x^2+2) + 10x(3x-2)$

$(7x^2+2x) + (2x^2+5) = 4x(7x^2+2x) + 14x(2x^2+5)$

$(2x+10) - (2x^3-10) = 6x^2(2x+10) - 2(2x^3-10)$

$(6x^4+10x) + (6x-3) = 6(6x^4+10x) + 24x^3(6x-3)$

$(20x+2) + (8x^5+6) = 40x(20x+2) - 20(8x^5+6)$



1) $4x^3 + 6x \quad 12x^2 + 6$ (9)

2) $8x^6 \quad f(x) = 48x^5$ (3)

3) $7 \quad f(x) = 0$ (1)

4) $(3x^3 + 2x) + (6x^4 + 6) \quad f(x) = 24x^3(3x^3 + 2x) + 9x^2(6x^4 + 6)$ (5)
$9x^2 + 2(6x^4 + 6)$

5) $(8x + 2) - (3x^2 - x)$
$f(x) = 6x(8x + 2) - 8(3x^2 - x)$ (5)

$(6x - 1)(8x + 2) - 8(3x^2 - x)$

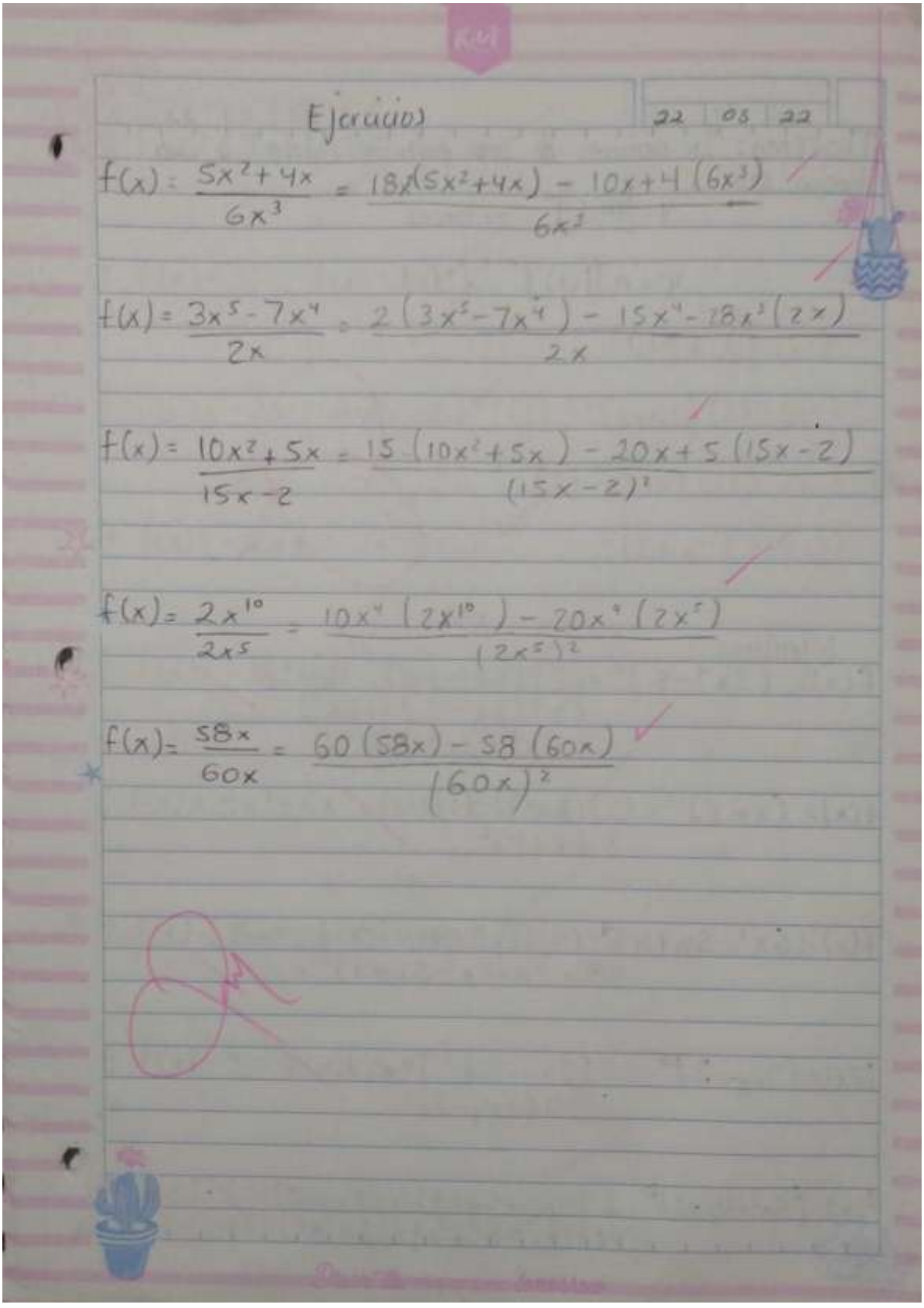
6) $(7x^2 + 4x) + (6x^3 - 2x^2)$
$18x^2 - 4x(7x^2 + 4x) + 14x + 4(6x^3 - 2x^2)$

7) $(2x^3 - 4x^2) + (2x + x)$
$2 + 1(2x^3 - 4x^2) + 6x^3 - 8x(2x + x)$

8) $(6x^4 + 2x^5) - (2x^6 + x^3)$
$12x^5 + 3x^3(6x^4 + 2x^5) - 24x^3 + 10x^4(2x^6 + x^3)$

9) $(3x^3 + 6) - (8x^2 - 2x)$
$16x - 2(3x^5) - 15x^4(8x^3 - 2x)$

10) $(9x^2 + 3x) + (x^3 + x^2)$
$3x^2 + 2x(9x^2 + 3x) + 18x + 3(x^3 + x^2)$



Ejercicio 22 08 22

$$f(x) = \frac{5x^2+4x}{6x^3} = \frac{18x(5x^2+4x) - 10x+4(6x^3)}{6x^3}$$

$$f(x) = \frac{3x^5-7x^4}{2x} = \frac{2(3x^5-7x^4) - 15x^4 - 18x^3(2x)}{2x}$$

$$f(x) = \frac{10x^2+5x}{15x-2} = \frac{15(10x^2+5x) - 20x+5(15x-2)}{(15x-2)^2}$$

$$f(x) = \frac{2x^{10}}{2x^5} = \frac{10x^4(2x^{10}) - 20x^9(2x^5)}{(2x^5)^2}$$

$$f(x) = \frac{58x}{60x} = \frac{60(58x) - 58(60x)}{(60x)^2}$$

22 03 22

TEOREMA: La derivada de una potencia entera de una función sea

$y = [f(x)]^n$ entonces

$y' = n[f(x)]^{n-1} f'(x)$

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

$f(x) = (3)(2x+3)^{3-1}(2)$

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

$f(x) = 6(2x+3)^2$

Ejercicios

$f(x) = (3x^4-5)^2 = (2)(3x^4-5)^{2-1}(12x^3)$

$(2)(3x^4-5)(12x^3)$

$24x^3(3x^4-5)$

$f(x) = (x+2)^3 = (3)(x+2)^2(1)$

$3(x+2)^2$

$f(x) = (6x^2-5x+4)^4 = (4)(6x^2-5x+4)^3(12x-5)$

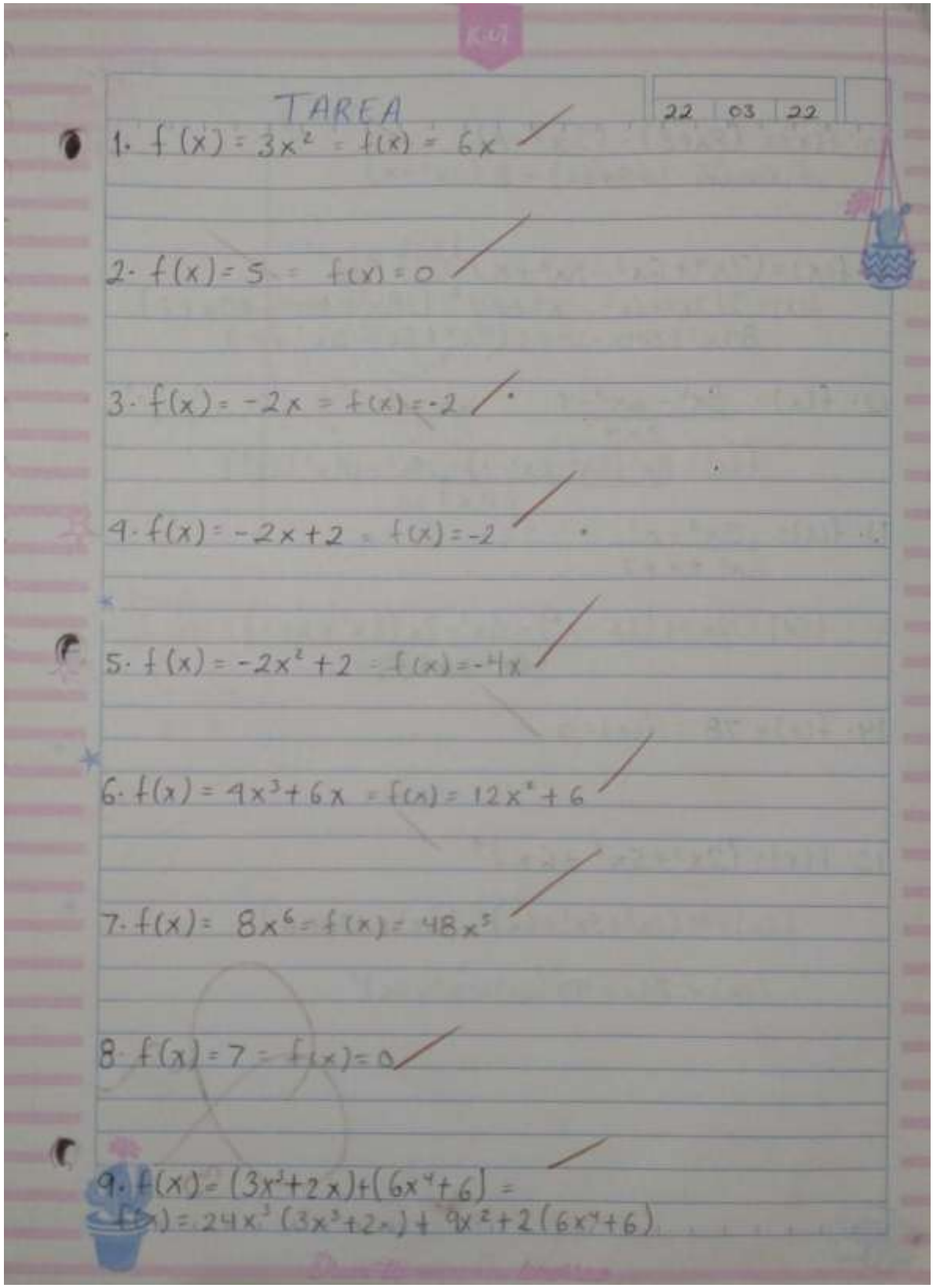
$98x-20(6x^2-5x+4)^3$

$f(x) = (2x4-3)^5 = 5(2x4-3)^4(2x4)$

$10(2x4-3)^4$

$f(x) = (5x^2+4y-3)^2\ 2(5x^2+4y-3)(10x+4)$

$20x+8(5x^2+4y-3)$



TAREA

22 03 22

1. $f(x) = 3x^2 \rightarrow f(x) = 6x$

2. $f(x) = 5 \rightarrow f(x) = 0$

3. $f(x) = -2x \rightarrow f(x) = -2$

4. $f(x) = -2x + 2 \rightarrow f(x) = -2$

5. $f(x) = -2x^2 + 2 \rightarrow f(x) = -4x$

6. $f(x) = 4x^3 + 6x \rightarrow f(x) = 12x^2 + 6$

7. $f(x) = 8x^6 \rightarrow f(x) = 48x^5$

8. $f(x) = 7 \rightarrow f(x) = 0$

9. $f(x) = (3x^2+2x)+(6x^4+6) =$
$f(x) = 24x^3(3x^2+2x) + 9x^2+2(6x^4+6)$

10. $f(x) = (8x+2) - (3x^2 - x)$

$f(x) = 6x - 1(8x+2) - 8(3x^2 - x)$

11. $f(x) = (7x^4 + 6x^3 - 5x^2 + x)^3$

$f(x) = 3(7x^4 + 6x^3 - 5x^2 + x)^2 (28x^3 + 18x^2 - 10x + 1)$

$84x^2 + 54x - 30 + 3(7x^4 + 6x^3 - 5x^2 + x)$

12. $f(x) = \frac{8x^6 - 6x^3 - 4}{2x^4}$ ·

$f(x) = \frac{8x^3(8x^6 - 6x^3 - 4) - 48x^5 - 18x^2(2x^4)}{(2x^4)^2}$

13. $f(x) = \frac{2x^3 - x^2}{6x^2 + x + 2}$ ·

$f(x) = \frac{12x+1(2x^3 - x^2) - 6x^2 - 2x(6x^2 + x + 2)}{(6x^2 + x + 2)^2}$

14. $f(x) = 78 \therefore f(x) = 0$

15. $f(x) = (2x^3 + 5x^2 + 6x)^4$

$f(x) = 4(2x^3 + 5x^2 + 6x)^3 (6x^2 + 10x + 6)$

$f(x) = 24x + 40(2x^3 + 5x^2 + 6x)^3$

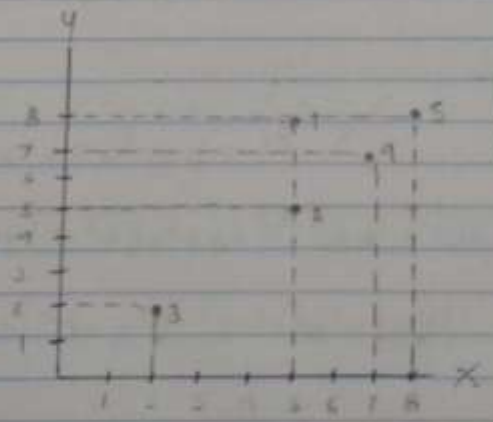
1. (x=5x+3 f(x)) f(x) = 5(1)+3 =y8

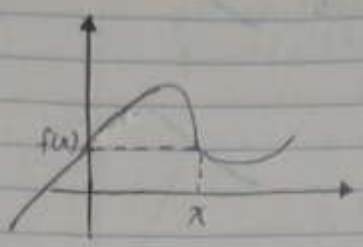
2. (x=5x², f(x)) = f(x) = 5(1)² =y5

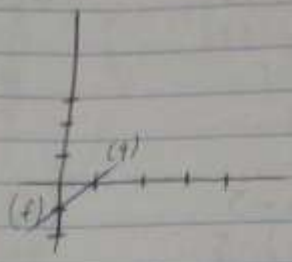
3. (x=2x³, f(x)) f(x) = 2(1)³ =y2

4. (x=7x, f(x)) f(x) = 7(1) =y7

5. (x=8x², f(x)) f(x) = 8(1)² =y8







Traza la gráfica $f(x) = 2x - 1$

Si f(0)
P(0, -1)
f(0) = 2(0) - 1
f(0) = 0 - 1
f(0) = -1

si f(1)
9 (1, 1)
f(1) = 2(1) - 1
f(1) = 2 - 1
f(1) = 1

Ejercicios

Si f(1)
P(1)
P(1, 1)

Si f(3)
9 (3)
9 (3, 7)

1. $f(x) = 3x - 2$
$f(1) = 3(1) - 2$
$f(1) = 1$

$f(3) = 3(3) - 2$
$f(3) = 9 - 2$
$f(3) = 7$

2. $f(x) = x^2 + 3$
$f(1) = 1^2 + 3$
$f(1) = 1 + 3$
$f(1) = 4$

$f(3) = 3^2 + 3$
$f(3) = 9 + 3$
$f(3) = 12$

3. $f(x) = -x + 2$
$f(1) = -1 + 2$
$f(1) = 1$

$f(3) = -3 + 2$
$f(3) = -1$

4. $f(x) = 6x + 1$ $\quad f(3) = 6(3) + 1$

$f(1) = 6(1) + 1$ $\quad f(3) = 18 + 1$

$f(1) = 6 + 1$ $\quad f(3) = 19$

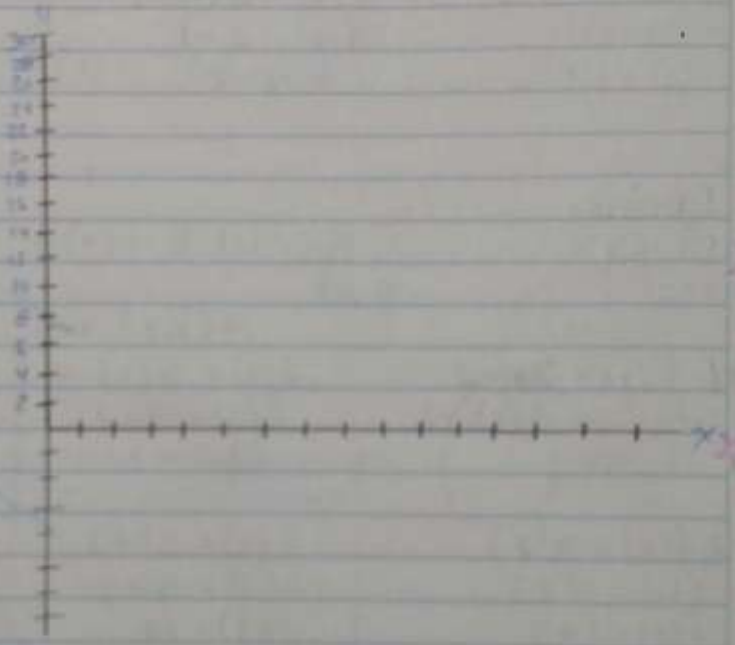
$f(1) = 7$

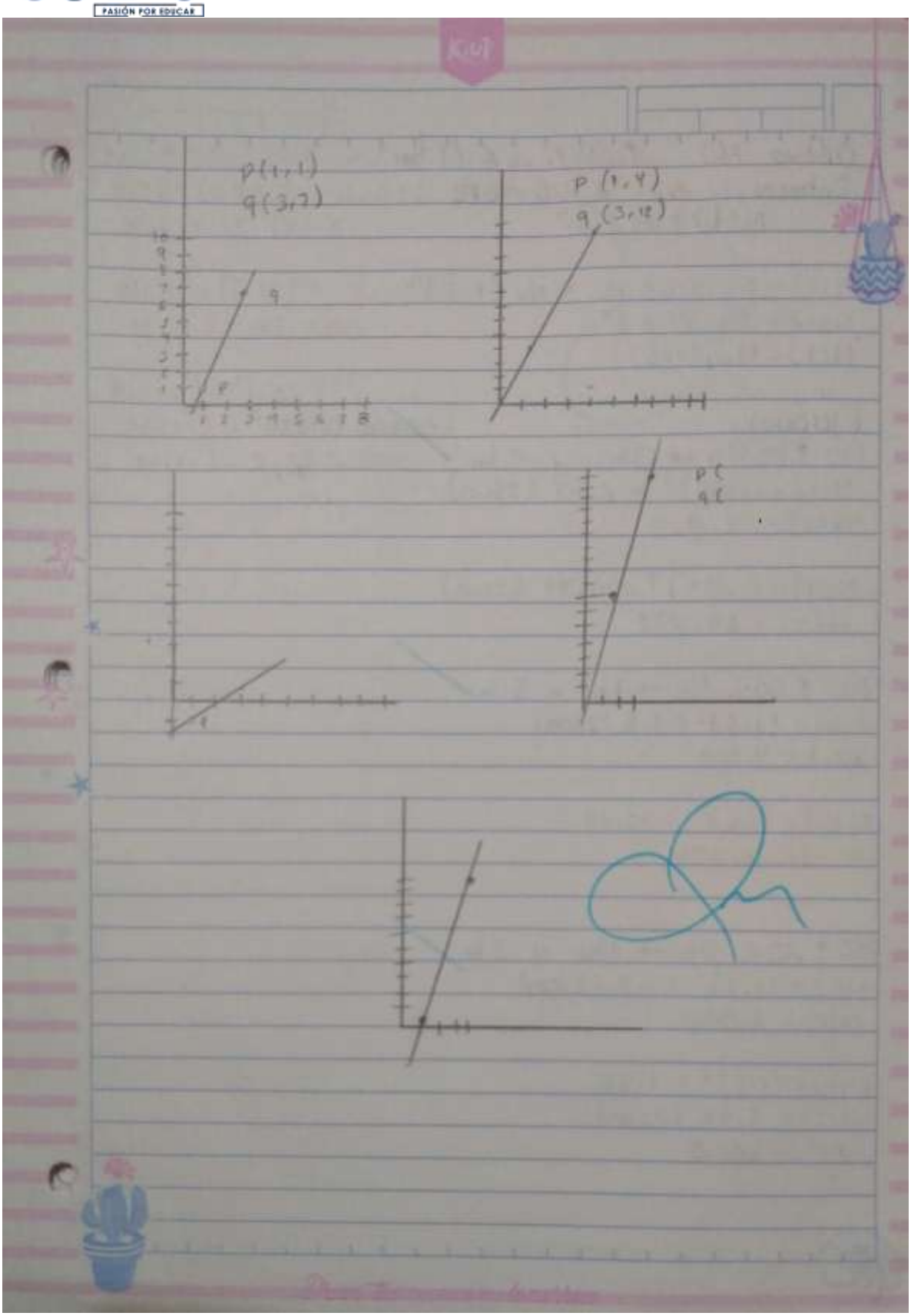
5. $f(x) = 5x - 5$ $\quad f(3) = 5(3) - 5$

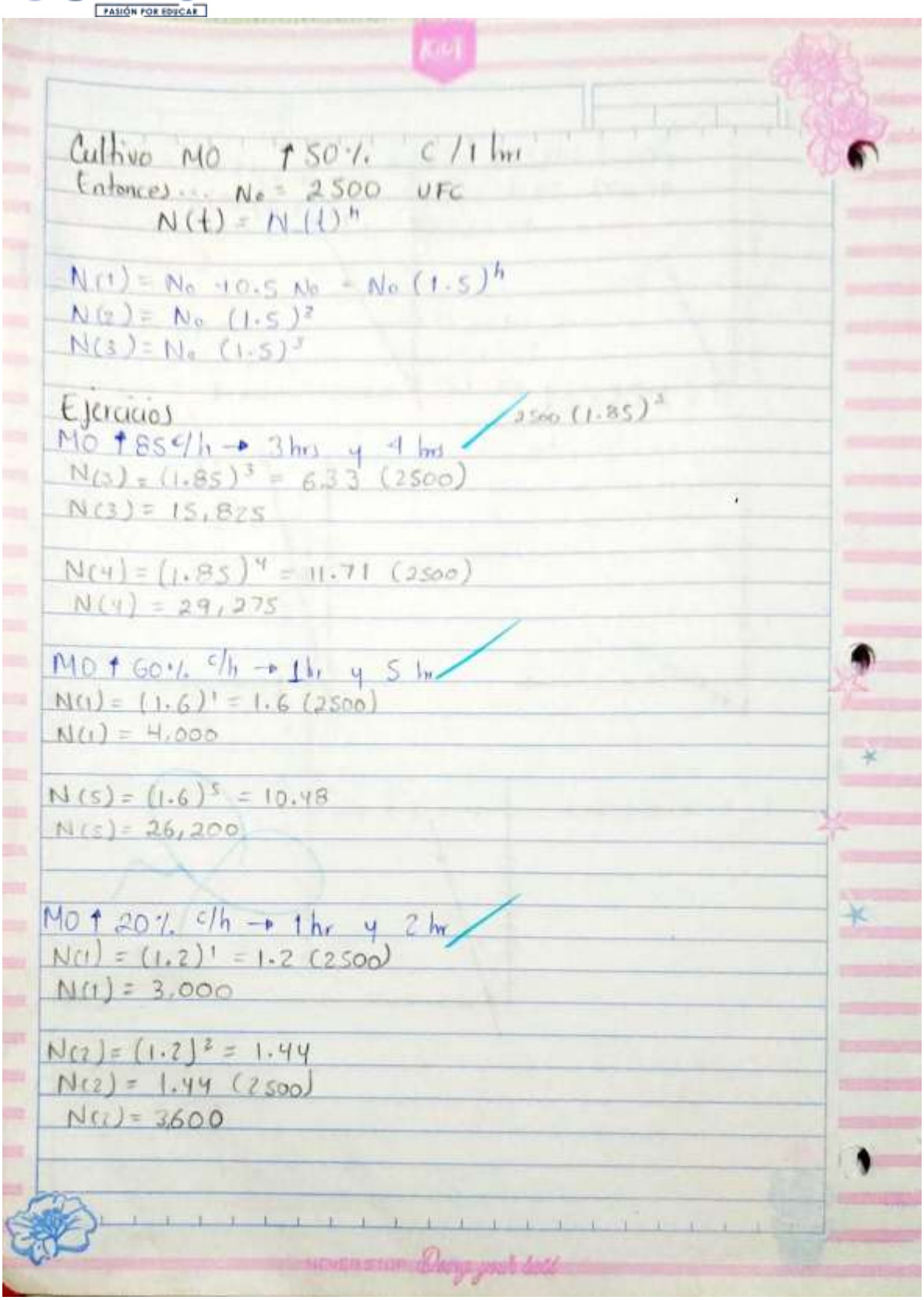
$f(1) = 5(1) - 5$ $\quad f(3) = 15 - 5$

$f(1) = 5 - 5$ $\quad f(3) = 10$

$f(1) = 0$




p(1,1)
q(3,7)
q
p
P (1,4)
q (3,12)
P
q



Cultivo MO ↑ 50% c/1 hr
Entonces... $N_0 = 2500$ UFC
$N(t) = N_0(t)^h$

$N(1) = N_0 + 0.5\,N_0 = N_0(1.5)^h$
$N(2) = N_0(1.5)^2$
$N(3) = N_0(1.5)^3$

Ejercicios
MO ↑ 85 c/h → 3 hrs y 4 hrs
$N(3) = (1.85)^3 = 6.33\ (2500)$
$N(3) = 15,825$

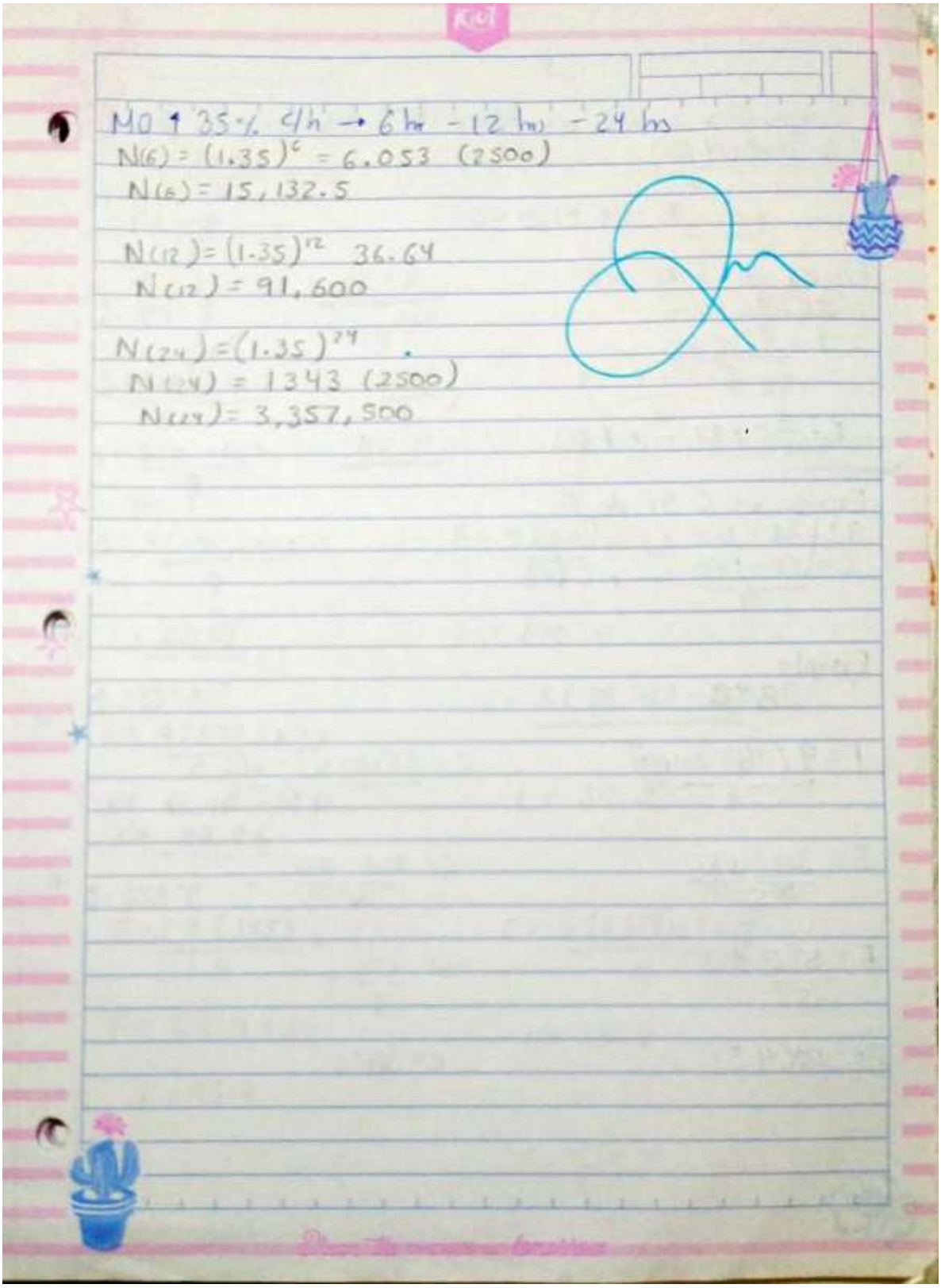
$N(4) = (1.85)^4 = 11.71\ (2500)$
$N(4) = 29,275$

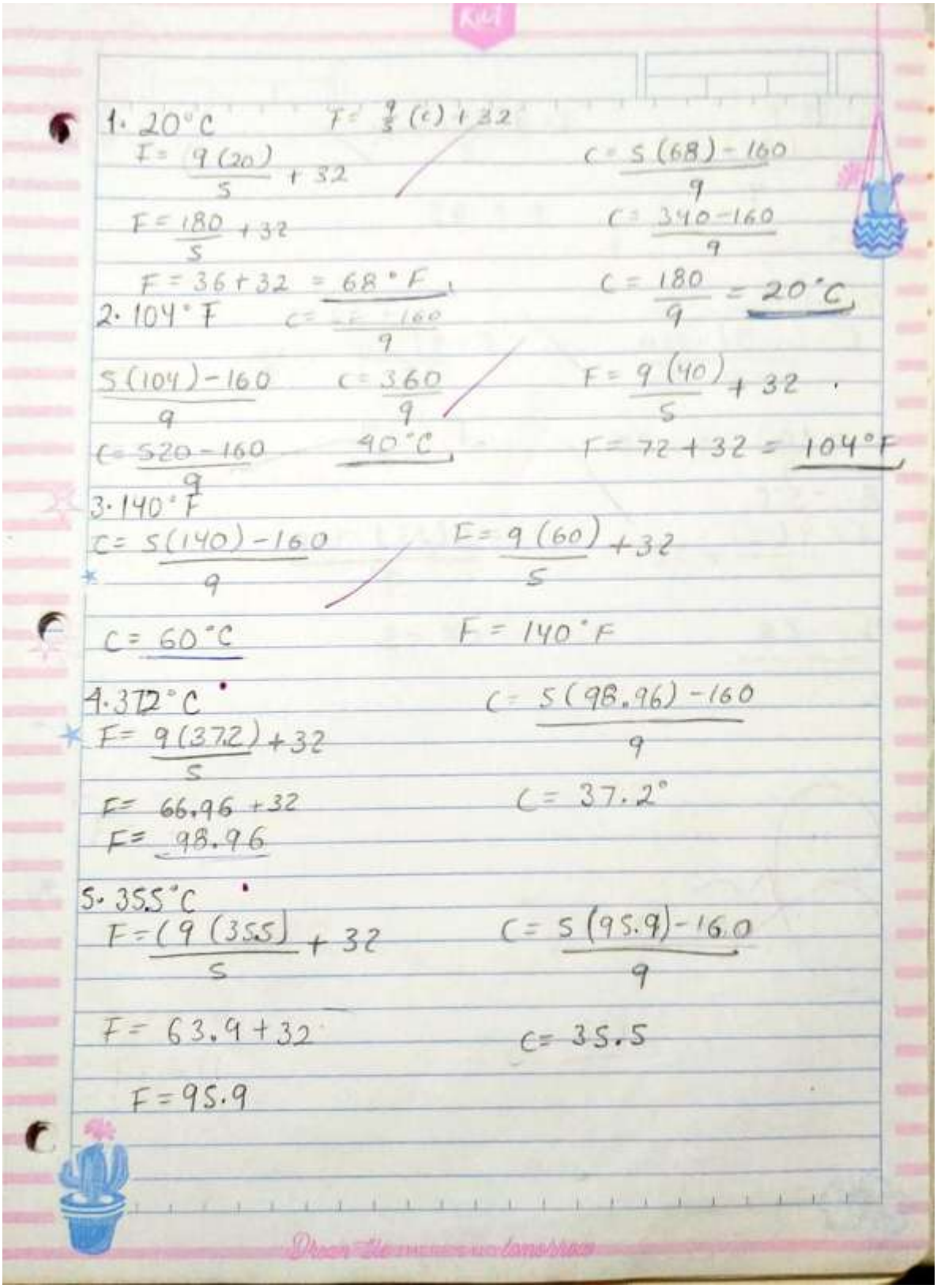
MO ↑ 60% c/h → 1 hr y 5 hr
$N(1) = (1.6)^1 = 1.6\ (2500)$
$N(1) = 4,000$

$N(5) = (1.6)^5 = 10.48$
$N(5) = 26,200$

MO ↑ 20% c/h → 1 hr y 2 hr
$N(1) = (1.2)^1 = 1.2\ (2500)$
$N(1) = 3,000$

$N(2) = (1.2)^2 = 1.44$
$N(2) = 1.44\ (2500)$
$N(2) = 3600$


MO 1 35% c/h → 6 hs - 12 hs - 24 hs
N(6) = (1.35)^6 = 6.053 (2500)
N(6) = 15,132.5
N(12) = (1.35)^12 36.64
N(12) = 91,600
N(24) = (1.35)^24
N(24) = 1343 (2500)
N(24) = 3,357,500



1. 20°C $F = \frac{9}{5}(c) + 32$

$F = \frac{9(20)}{5} + 32$

$F = \frac{180}{5} + 32$

$F = 36 + 32 = 68°F$

$C = \frac{5(68) - 160}{9}$

$C = \frac{340 - 160}{9}$

$C = \frac{180}{9} = 20°C$

2. 104°F $C = \frac{5(104) - 160}{9}$

$C = \frac{520 - 160}{9}$

$C = \frac{360}{9}$

$40°C$

$F = \frac{9(40)}{5} + 32$

$F = 72 + 32 = 104°F$

3. 140°F

$C = \frac{5(140) - 160}{9}$

$C = 60°C$

$F = \frac{9(60)}{5} + 32$

$F = 140°F$

4. 372°C

$F = \frac{9(372)}{5} + 32$

$F = 66.96 + 32$

$F = 98.96$

$C = \frac{5(98.96) - 160}{9}$

$C = 37.2°$

5. 35.5°C

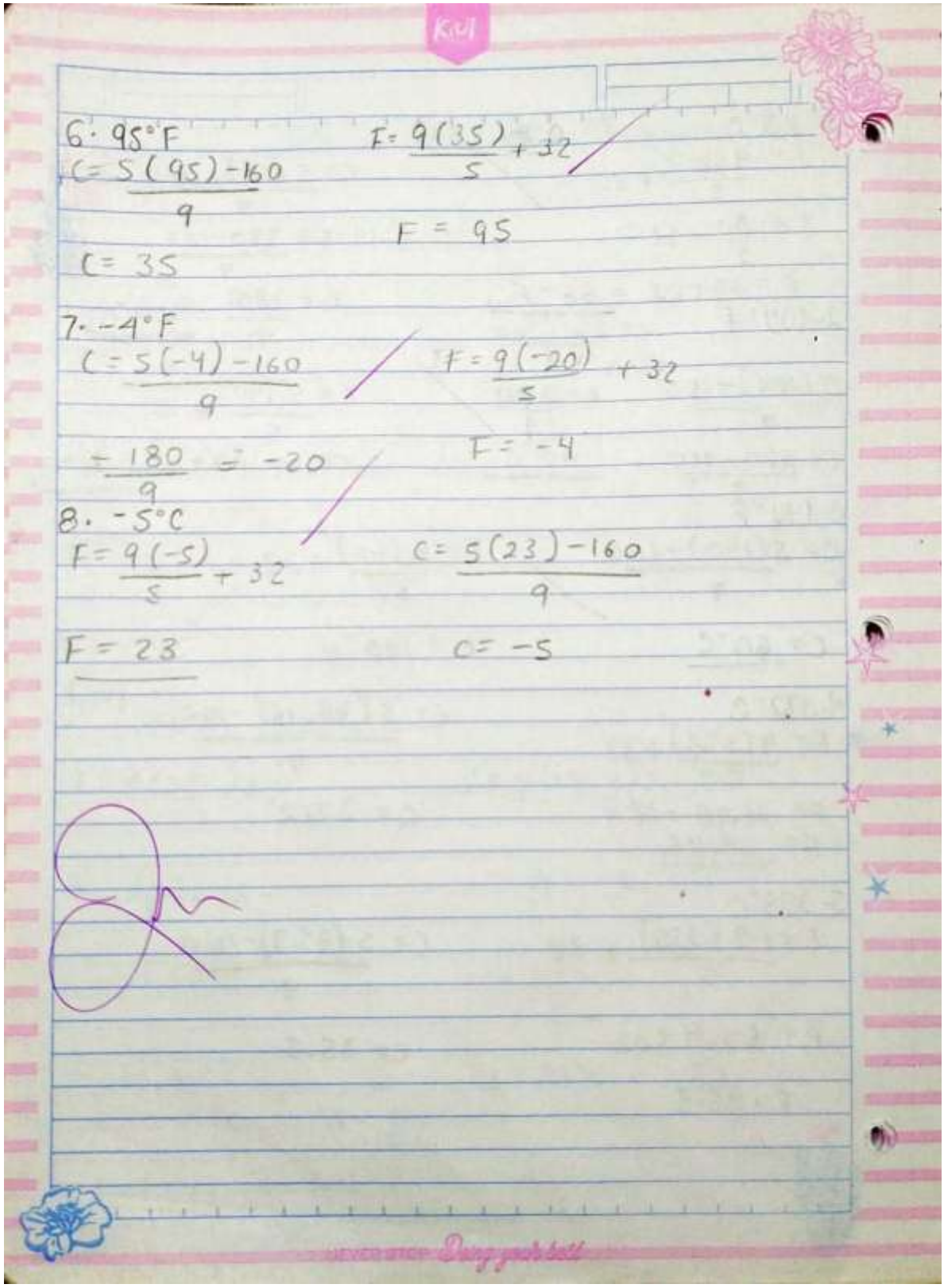
$F = \frac{(9(355)}{5} + 32$

$F = 63.9 + 32$

$F = 95.9$

$C = \frac{5(95.9) - 160}{9}$

$C = 35.5$



6. 95°F

$C = \frac{5(95) - 160}{9}$

$C = 35$

$F = \frac{9(35)}{5} + 32$

$F = 95$

7. -4°F

$C = \frac{5(-4) - 160}{9}$

$= \frac{180}{9} = -20$

$F = \frac{9(-20)}{5} + 32$

$F = -4$

8. -5°C

$F = \frac{9(-5)}{5} + 32$

$F = 23$

$C = \frac{5(23) - 160}{9}$

$C = -5$