

中2 数学 灯(3) × 七

$$(1) (3x+2y) + (2x-5y) \\ = 5x - 3y$$

$$(2) (-7x)^2 \times y \\ = 49x^2y$$

$$(3) -\frac{3}{4}a^3b^2 \div (-6a^2b) \times \frac{8}{3}b^2$$

$$= \frac{\overset{1}{\cancel{3}} \overset{2}{a} \overset{1}{\cancel{b}} \times \overset{2}{\cancel{8}} \overset{2}{b}}{\underset{1}{\cancel{4}} \times \underset{3}{\cancel{6}} \overset{2}{a} \overset{1}{\cancel{b}} \times \overset{1}{\cancel{3}} \overset{2}{b}} \times \overset{2}{b}$$

$$= \frac{1}{5}ab^3$$

$$(4) \frac{1}{3}(2x-3y) - \frac{1}{15}(5x+12y)$$

$$= \frac{5(2x-3y) - (5x+12y)}{15}$$

$$= \frac{10x - 15y - 5x - 12y}{15}$$

$$= \frac{5x - 27y}{15}$$

$$2. \begin{cases} 4x+3y=1 \dots (1) \\ 2x-3y=5 \dots (2) \end{cases}$$

①+②より

$$\begin{array}{r} 4x+3y=1 \\ 2x-3y=5 \\ \hline 6x = 6 \\ x=1 \end{array}$$

$$\begin{cases} x=1 \\ y=-1 \end{cases}$$

$$\textcircled{1} \div x = 1 \text{ 代入 } \begin{cases} 4+3y=1 \\ 3y=-3 \\ y=-1 \end{cases}$$

$$(2) \begin{cases} 2-4y=-2 \dots (1) \\ 2y=8-3x \dots (2) \end{cases}$$

①より②を代入

②より $x=2y$

$$\begin{aligned} x-2(2y) &= -2 \\ x-2(8-3x) &= -2 \\ x-16+6x &= -2 \\ 7x &= 14 \\ x &= 2 \end{aligned}$$

$$\begin{aligned} \text{代入} \\ 2y &= 8-6 \\ 2y &= 2 \\ y &= 1 \end{aligned}$$

$$3. \begin{cases} \frac{1}{2}x + \frac{5}{8}y = \frac{1}{3} \dots (1) \\ -\frac{5}{8}x - \frac{1}{4}y = 3 \dots (2) \end{cases}$$

①×6, ②×8より

$$\begin{cases} 3x+5y=2 \\ 5x-2y=24 \end{cases}$$

$$4 \begin{cases} -0.3x + 0.1y = -1 & \dots ① \\ x - \frac{a}{2} = \frac{y}{2} & \dots ② \end{cases}$$

$$bx - y = 4x - 7y - 12 = -5x + 6y + 28 \dots ③$$

$$① \times 10 \text{ d'}$$

$$-3x + y = -10 \dots ④$$

$$③ \text{ d' } 4x - 7y - 12 = -5x + 6y + 28$$

$$4x - 7y + 5x - 6y = 28 + 12$$

$$9x - 13y = 40 \dots ⑤$$

$$④ \times 3 + ⑤ \text{ d'}$$

$$-9x + 3y = -30$$

$$④ \text{ i' } y = -1 \text{ et } x$$

$$\begin{cases} -3x - 1 = -10 \\ -3x = -9 \\ x = 3 \end{cases}$$

$$\begin{array}{r} +) \quad 9x - 13y = 40 \\ \hline -10y = 10 \\ y = -1 \end{array}$$

$$② \text{ i' } x = 3, y = -1 \text{ et } a$$

$$3 - \frac{a}{2} = \frac{-1}{2}$$

$$6 - a = -1$$

$$-a = -7$$

$$a = 7$$

$$③ \text{ d'}$$

$$bx - y = 4x - 7y - 12 \text{ i' } x = 3, y = -1$$

$$3b + 1 - 12 + 7 - 12$$

$$3b = 6$$

$$b = 2$$

$$\begin{cases} a = 7 \\ b = 2 \end{cases}$$

$$5 \text{ (1) } V_p = \pi r^2 \times h \times \frac{1}{3}$$

$$\frac{1}{3} \pi r^2 h$$

⑦

$$V_0 = \pi (2r)^2 \times \frac{1}{3} h \times \frac{1}{3}$$

$$= \frac{4}{9} \pi r^2 h$$

⑧

$$\frac{\frac{4}{9} \pi r^2 h}{\frac{1}{3} \pi r^2 h}$$

$$= \frac{\frac{4 \pi r^2 h}{9}}{\frac{\pi r^2 h}{3}} \times \frac{3}{\pi r^2 h}$$

$$= \frac{4}{3} \text{ 倍}$$

(2) 半径を a 倍, 高さを b 倍にする

$$V_p = \frac{1}{3} \pi r^2 h \times 12$$

$$= 4 \pi r^2 h$$

$$\pi \times (ar)^2 \times bh \times \frac{1}{3} = 4 \pi r^2 h$$

$$\frac{1}{3} \pi a^2 b r^2 h = 4 \pi r^2 h$$

$$\frac{a^2 b}{3} = 4$$

$$a^2 b = 12$$

$$a = 1 \text{ のとき}$$

$$1^2 b = 12$$

$$b = 12$$

$$a = 2 \text{ のとき}$$

$$2^2 b = 12$$

$$b = 3$$

$$\underline{A \text{ } \overline{J} = 2, \overline{I} = 3.}$$

6. (1) 1段目から右下にナメに +3 ずつ変化していく

12段目まで +3 が 11回 入る

$$A = 1 + 3 \times 11 = \underline{34}$$

(2) ① $a \quad b$

② $a \quad a+b \quad b$

③ $a \quad 2a+b \quad a+2b \quad b$

④ $\boxed{a \quad 3a+b \quad 3a+3b \quad a+3b \quad b}$

④の和 $a + 3a+b + 3a+3b + a+3b + b$

$$= 8a + 8b$$

$$= 8(a+b)$$

13) $-2 + x = 6$

$$\underline{x = 8}$$

$-2 \quad 8 \quad \rightarrow 6 \quad \text{ok}$

$-2 \quad 6 \quad 8 \quad \rightarrow 12 \quad \text{ok}$

$-2 \quad 4 \quad 14 \quad 8 \quad \rightarrow 24 \quad \text{ok}$

$-2 \quad 2 \quad 18 \quad 22 \quad 8 \quad \rightarrow 48 \quad \text{ok}$

7 (1) 3, 5, 7

(2) $y = 2 \times 3 + 3$

$y = 9$

(3) $y = -4x + 12$

$a = \frac{\Delta y}{\Delta x}$

$\frac{\Delta y}{\Delta x} = -4$ i.e. $\Delta x = 6$ est Δ

$\frac{\Delta y}{6} = -4$

$\Delta y = -24$

(4) $y = ax + b$

x	2	→	5
y	7	→	13

$\Delta x = 5 - 2 = 3$

$\Delta y = 13 - 7 = 6$

$\frac{\Delta y}{\Delta x} = \frac{6}{3} = 2$ a

$y = 2x + b$ i.e. $(2, 7)$ est Δ

$7 = 4 + b$

$b = 3$

$\begin{cases} a = 2 \\ b = 3 \end{cases}$

8 (1) $x=0$ かつ $y=1$ より $b=1$ (代入)

$y=ax+1$ に $x=2, y=5$ を代入

$$5 = 2a + 1$$

$$2a = 4$$

$$a = 2$$

$$y = 2x + 1$$

(2) 変化割合 $a = -3$

$y = -3x + b$ に $x = -2, y = 4$ を代入

$$4 = -3 \times (-2) + b$$

$$4 = 6 + b$$

$$b = -2$$

$$y = -3x - 2$$

(3)

x	-8	-4	2
y	13	3	-12

$y = ax + b$ に $(-4, 3)$ を代入

$$3 = -4a + b \dots \textcircled{1}$$

$y = ax + b$ に $(2, -12)$ を代入

$$-12 = 2a + b \dots \textcircled{2}$$

$\textcircled{1} - \textcircled{2}$ より

$$3 = -4a + b$$

$$+ 12 = 2a + b$$

$$\begin{array}{r} + \\ - \end{array} \begin{array}{r} 3 \\ 12 \end{array} = \begin{array}{r} -4a + b \\ 2a + b \end{array}$$

$$15 = -6a$$

$$a = -\frac{15}{6} = -\frac{5}{2}$$

$\textcircled{2}$ に $a = -\frac{5}{2}$ を代入

$$-12 = 2 \times (-\frac{5}{2}) + b$$

$$-12 = -5 + b$$

$$b = -7$$

$$y = -\frac{5}{2}x - 7$$

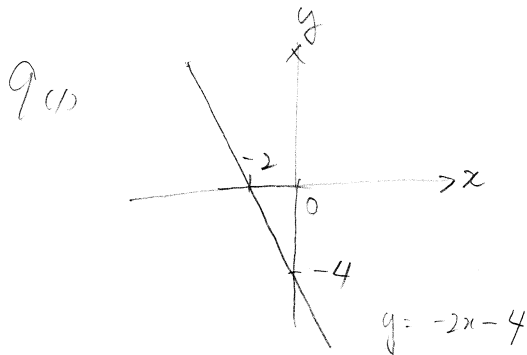
$$8(4) \quad y: -x + \frac{3}{2} \text{ 平行 } a = -1$$

$$y: -x + b \text{ 点 } (-4, 5) \text{ を通す}$$

$$5 = 4 + b$$

$$b = 1$$

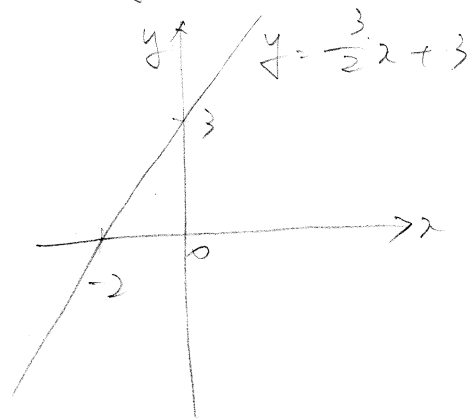
$$y = -x + 1$$



$$(2) \quad \frac{x}{2} - \frac{y}{3} = -1$$

$$\frac{3}{2}x - y = -3$$

$$y = \frac{3}{2}x + 3$$



$$(3) \quad y = -2x - 4$$

$$y = \frac{3}{2}x + 3$$

$$\frac{3}{2}x + 3 = -2x - 4$$

$$3x + 6 = -4x - 8$$

$$7x = -14$$

$$x = -2$$

$$y = -2 \times (-2) - 4$$

$$y = 4 - 4$$

$$y = 0 \quad (-2, 0) \quad \leftarrow \text{グラフをちゃんとかけるとわかる}$$

計算しなくともわかるよ。

10 (1) $l: y = -2x - 3$

(2) 傾角 $\frac{1}{3}$

切片 $(0, 1)$

$m: y = \frac{1}{3}x + 1$

(3)
$$\begin{cases} y = -2x - 3 \\ y = \frac{1}{3}x + 1 \end{cases}$$

$\frac{1}{3}x + 1 = -2x - 3$

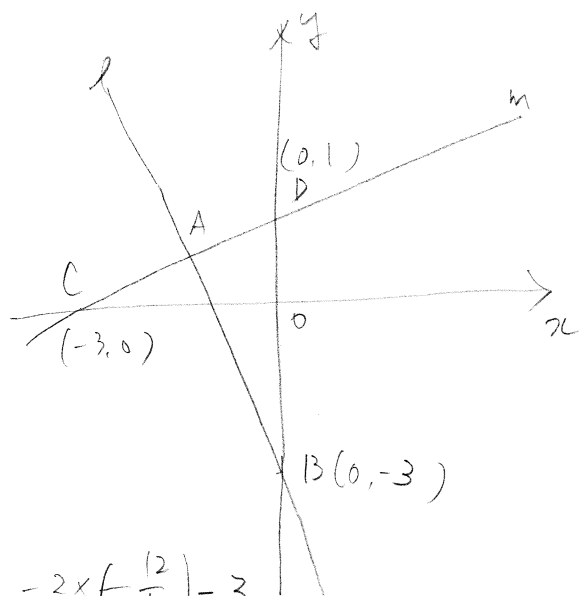
$x + 3 = -6x - 9$

$7x = -12$

$x = -\frac{12}{7}$

$$\begin{aligned} y &= -2 \times \left(-\frac{12}{7}\right) - 3 \\ &= \frac{24}{7} - \frac{21}{7} \\ &= \frac{3}{7} \end{aligned}$$

$A\left(-\frac{12}{7}, \frac{3}{7}\right)$



11 (1) 百位 x , 十位 y

(1) $100x + 20 + y$ (2) $100y + 20 + x$

$$\begin{cases} x + y = 16 \\ 100x + 20 + y - (100y + 20 + x) = 198 \end{cases}$$

(2) 100円 a 本, 110円 b 本, 120円 c 本

$$\begin{cases} a + b + c = 39 \\ 100a + 110b + 120c = 4000 \\ b = 3c \end{cases}$$

(2) $b = 3c$ を (1) に代入

$$a + 3c + c = 39$$

$$a + 4c = 39$$

$$100a + 110 \times 3c + 120c = 4000$$

$$100a + 330c + 120c = 4000$$

$$100a + 450c = 4000$$

$$10a + 45c = 400$$

$$2a + 9c = 80$$

$$\begin{cases} a + 4c = 39 \\ 2a + 9c = 80 \end{cases}$$

$$11 \quad (3) \quad x + y = 165 \quad \text{①}$$

$$\text{増減} \quad 0.2x - 0.15y = 5$$

$$\text{全体} \quad 1.2x + 0.85y = 165 + 5$$

$$\frac{20}{100}x - \frac{15}{100}y = 5 \quad \frac{x}{5} - \frac{3}{20}y = 5 \quad \text{②}$$

$$\frac{120}{100}x + \frac{85}{100}y = 165 + 5$$

I, ①

$$14) \quad \begin{cases} \text{対} & 12x + 12y = 3000 \quad \text{①} \\ \text{同} & 20x - 20y = 3000 \quad \text{②} \end{cases}$$

$$\begin{aligned} 12. \quad N &= 7a + 4 \\ N &= 3b + 2 \\ b - a &= 14 \end{aligned} \quad \begin{cases} 7a + 4 = 3b + 2 \\ b - a = 14 \end{cases}$$

$$\downarrow (3a + 2a = 5a) \quad \text{ヤ、ト}$$

$$13 \quad \begin{cases} 3 \times \text{お} + 7 \times \text{ち} = 159 \dots \text{①} \\ x + y = 68 \dots \text{②} \end{cases}$$

$$12) \quad 159 \div 5 = 31 \dots 4$$

2 × お
2 お | 違ひ

$$\text{①} - \text{②} \times 2$$

$$3x + 2y = 159$$

$$-) 2x + 2y = 136$$

$$x = 23$$

$$3 \times \text{お} + 3 \times \text{ち}$$

$$2 \times \text{お} + 3 \times \text{ち}$$

$$\text{②} \quad x = 23 \text{ 代入} \quad \begin{cases} x = 23 \\ y = 45 \end{cases}$$

$$23 + y = 68$$

$$y = 68 - 23$$

$$y = 45$$

$$\text{A. } 3 \times \text{お} + 7 \times 23 \quad 2 \times \text{お} + 7 \times 45$$