南山大学経済学部 入学前課題の解答

I. 数と式の計算

1. (1) 5　(2) $\frac{6}{5}$　(3) -1　(4) 29　(5) 2　(6) 23　(7) 44　(8) 15　(9) -7　(10) 56　(11) $\frac{11}{6}$
   (12) $-\frac{1}{10}$　(13) $-\frac{3}{5}$　(14) 5
2. (1) 2　(2) 18　(3) 13　(4) 37　(5) 13　(6) $\frac{27}{8}$　(7) 729　(8) 0　(9) $\frac{111}{100}$　(10) $\frac{27}{2}$
3. (1) $5a^2+3a$　(2) $-a^3+4a^2-5a+7$　(3) $-a^2+2ab$　(4) $ab+3a-b$　(5) $3a^5$　(6) $8x^6y^4$
   (7) $2pq^9$　(8) $-40s^9t^{10}$　(9) a^2b^2　(10) $-2x^5y$
4. (1) $\sqrt{10}$　(2) $3\sqrt{5}$　(3) $\sqrt{3}$　(4) 2　(5) $3\sqrt{2}$　(6) 18　(7) $-2\sqrt{5}$　(8) 6　(9) $\frac{10}{3}$　(10) 0
5. (1) x^2-9　(2) x^2-x-6　(3) x^2-5x+4　(4) $2x^2-x-3$　(5) $6x^2+19x+15$　(6) $48x^2+16x-32$
   (7) $-x^2-x+6$　(8) x^3-x^2-12x　(9) $x^2+10x+25$　(10) $4x^2-20x+25$
6. (1) $x^2-\frac{1}{2}x-\frac{1}{2}$　(2) $x^2+\frac{2}{3}x-\frac{8}{3}$　(3) $x^2-x+\frac{5}{36}$　(4) $\frac{1}{2}x^2+x-4$　(5) $\frac{1}{9}x^2+\frac{1}{2}x+\frac{9}{16}$
   (6) $\frac{1}{24}x^2-\frac{1}{6}$
7. (1) x^2-4y^2　(2) $2x^2-3xy-2y^2$　(3) $x^2+3ax-bx-3ab$　(4) $x^2-2ax+2bx-4ab$
   (5) $a^2-ab-6b^2$　(6) $4p^2+4pq+q^2$　(7) $a^2b^2x^2+4ab^2x+4b^2$　(8) $x^3+9x^2+27x+27$
   (9) x^3+2x^2-5x-6　(10) x^4-81　(11) x^4+3x^2-10　(12) x^8-256
8. (1) $(x+1)(x+2)$　(2) $(x+2)^2$　(3) $(x-1)(x+6)$　(4) $(x+2)(x+3)$　(5) $(2x-1)(x-1)$
   (6) $(2x+1)(3x-2)$　(7) $(x-a)(x+3a)$　(8) $(x-2y)(x-4y)$　(9) $(x+8y)(x+12y)$
   (10) $x(x-6)^2$
9. (1) $(x+2)(x^2+1)$　(2) $(a-b)(x+4)$　(3) $(x+a-1)^2$　(4) $(x+1)(x+a+2)$　(5) $(2xy+1)^2$
   (6) $(x-1)^3$　(7) $(-3x+2)^3$　(8) $(x-1)(x-2)(x+2)(x-5)$　(9) $(x-1)(x-3y)^2$
   (10)$(x-1)(x+2)(x^2-x+3)$
10. (1) $6a-b$　(2) $3a+7b$　(3) $-a^2-b^2+2ab+9a+6b$　(4) $5(2a^2+2ab+b^2)$　(5) $(6a-b)(2a+3b)$
    (6) $5a(2a+3b)$　(7) $25a^2(a-b)$
11. (1) $300\times80-100\times80=16,000$ 円　(2) $(120\times5+50\times4)\times1.08=864$ 円
    (3) $\{20\times(1-0.2)-12\}\times0.7=2.8$ 万円　(4) $(300+4\times60)\div60=9$
12. (1) $y=px-cx$ または $y=(p-c)x$　(2) $z=1.08(px+qy)$ または $z=1.08px+1.08qy$
    (3) $S=0.7\times(0.8m-x)=0.56m-0.7x$　(4) $y=\frac{A+cx}{x}$

II. 方程式と不等式

1. (1) $x=3$ (2) $x=6$ (3) $x=2$ (4) $x=-10$ (5) $x=-3$ (6) $x=-\frac{8}{3}$ (7) $x=-\dfrac{1}{2}$
   (8) $x=10$ (9) $x=-\frac{8}{5}$ (10) $x=\frac{65}{2}$ (11) $y=\frac{3}{2}$ (12) $y=\frac{12}{7}$
2. (1) $x=\frac{1}{3}(a-2)$ (2) $x=\frac{1}{2}(a+7)$ (3) $x=-\frac{1}{2}(3a-1)$ (4) $x=-a+3b-2$ (5) $x=3(a+b)$
   (6) $x=\frac{3}{a}$ (7) $x=\frac{2b}{a+b}$ (8) $x=-\frac{a}{3}+\frac{2b}{3}$ (9) $x=\frac{2a+15b}{12(a+b)}$ (10) $x=\frac{ab}{a+b}$ (11) $x=\frac{1}{a}$
   (12) $x=-\frac{3a}{b}$
3. (1) $x=-3,1$ (2) $x=3$ (3) $x=2,3$ (4) $x=-\frac{4}{3},1$ (5) $x=-4,2$ (6) $x=-2,0$
   (7) $x=-5,-8$ (8) $x=-\frac{1}{4},1$ (9) $x=-a,4a$ (10) $x=2,a-1$
4. (1) $x=\frac{5\pm\sqrt{29}}{2}$ (2) $x=2\pm\sqrt{2}$ (3) $x=2\pm2\sqrt{2}$ (4) $x=\frac{-1\pm\sqrt{21}}{2}$ (5) $x=\frac{1\pm\sqrt{13}}{3}$
   (6) $x=3\pm\sqrt{6}$ (7) $x=\frac{3\pm\sqrt{33}}{2}$ (8) $x=\frac{-5\pm\sqrt{10}}{3}$ (9) $x=\frac{3\pm\sqrt{9+20a}}{2}$ (10) $x=\frac{-a\pm\sqrt{a^2+8a-4}}{2}$
5. (1) $x>2$ (2) $x\leqq 7$ (3) $x>-\frac{7}{2}$ (4) $x\leqq\frac{12}{5}$ (5) $x\geqq -8$ (6) $x>3$
6. (1) $x<-2,\ x>3$ (2) $1\leqq x\leqq 4$ (3) $-1\leqq x\leqq -\frac{1}{2}$ (4) $x<2-\sqrt{2},\ x>2+\sqrt{2}$
   (5) $x\leqq -1-\sqrt{2},\ x\geqq -1+\sqrt{2}$ (6) $\frac{9-3\sqrt{5}}{2}<x<\frac{9+3\sqrt{5}}{2}$
7. (1) $-2<x<5$ (2) $1<x<3$ (3) $-3\leqq x\leqq 5$ (4) $1<x\leqq 5$ (5) $-\frac{3}{2}\leqq x\leqq\frac{4}{3}$
   (6) $-1<x<\frac{4}{3}$ (7) $x<5$ (8) $x\geqq 2$
8. (1) 130 個 (2) 16 人 (3) $x=\frac{M-qY}{p-q}$ (4) $x>\frac{F}{Y-c}$

III. 連立方程式

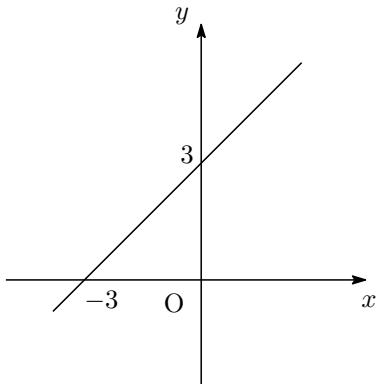
1. (1) $(x,y)=(6,14)$ (2) $(x,y)=(1,4)$ (3) $(p,q)=(-1,-1)$ (4) $(p,q)=(75,25)$
   (5) $(x,y)=\left(\frac{4}{3},\frac{23}{3}\right)$ (6) $(x,y)=\left(\frac{14}{5},\frac{13}{5}\right)$ (7) $(r,Y)=(12,80)$ (8) $(r,Y)=(160,400)$
2. (1) $(x,y)=(2,12)$ (2) $(x,y)=\left(\frac{5}{2},1\right)$ (3) $(p,q)=(2,-1)$ (4) $(s,t)=(0,3)$
   (5) $(x,y)=(6,3)$ (6) $(x,y)=\left(-\frac{2}{5},\frac{3}{2}\right)$
3. (1) $(x,y)=\left(\frac{30}{11},\frac{20}{11}\right)$ (2) $(x,y)=(-4,0)$ (3) $(x,y)=(6,-3)$ (4) $(x,y)=\left(\frac{2}{3},\frac{1}{5}\right)$
4. (1) $p=40$ (2) $p=70$ (3) $p=6$ (4) $p=40$

IV. 1 次関数

1. (1) $y=8$ (2) $y=7$ (3) $y=-5$ (4) $y=26$ (5) $y=-3$ (6) $y=-\frac{1}{4}$ (7) $y=-2$
   (8) $y=\frac{9}{2}$
2. (1) $q=80$ (2) $q=60$ (3) $q=5$ (4) $q=20$ (5) $q=90$ (6) $q=\frac{80}{3}$
3. (1) $y=3x+2$ (2) $y=-2x+100$ (3) $y=\frac{1}{3}x-3$ (4) $y=-2x+120$ (5) $y=\frac{4}{3}x-\frac{1}{3}$ (6) $-\frac{3}{4}x+\frac{29}{4}$ (7) $y=\frac{1}{1-c}x+I+G$ (8) $y=-\frac{t}{s}x+t$

4.

(1)



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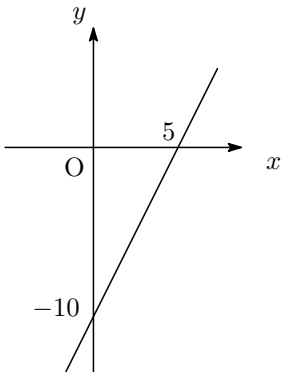

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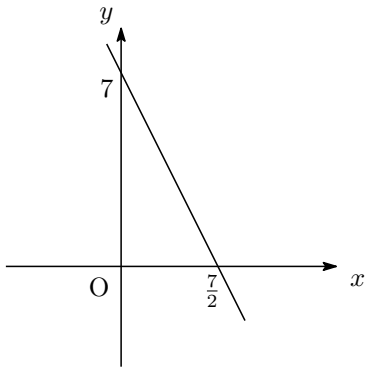

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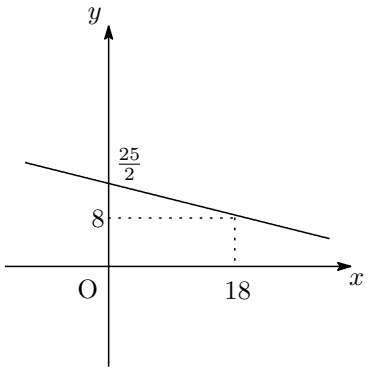

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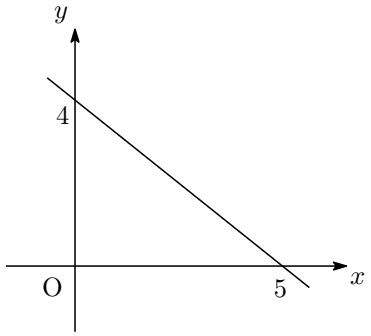

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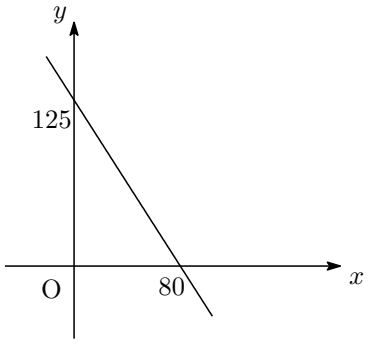
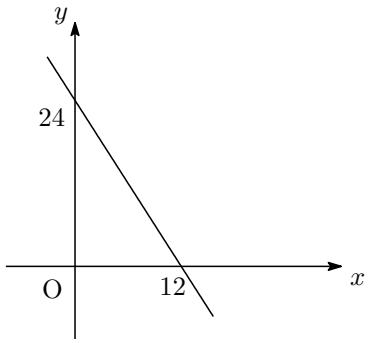


※ 座標指定の方法はこの通りでなくても構わない。2 点を特定するか，1 点と傾きを明示していること。

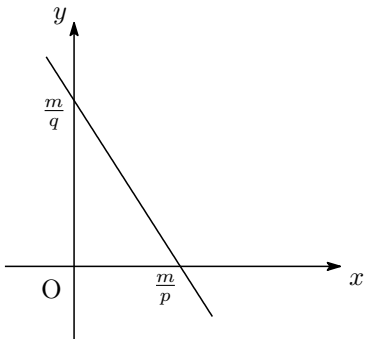
5. (1) $100x + 50y = 1200$ もしくは，　$y = -2x + 24$

6. (1) $px + qy = m$ もしくは，$y = -\frac{p}{q}x + \frac{m}{q}$

5.(2)



6.(2)

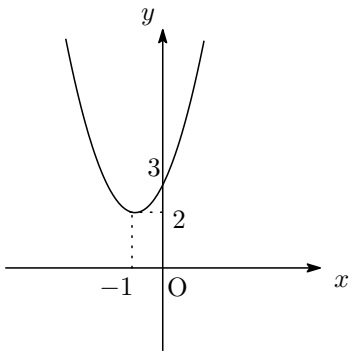


V. 2 次関数

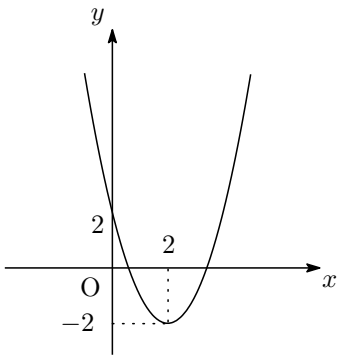
1. (1) $y = 4$　(2) $y = -5$　(3) $y = 7$　(4) $y = \frac{13}{6}$　(5) $y = \frac{7}{30}$
2. (1) $x = \pm 3$　(2) $x = 3$　(3) $x = -4, 2$　(4) $x = 1, 3$　(5) $x = \frac{-3 \pm \sqrt{33}}{2}$　(6) $x = \frac{2 \pm 2\sqrt{7}}{3}$
   (7) $x = 2 \pm \sqrt{5}i$
3. (1) $y = (x-2)^2 + 3$　(2) $y = -2(x+4)^2 + 6$　(3) $y = 3(x-2)^2 + 1$　(4) $y = -\frac{1}{8}(x+3)^2 + 5$
   (5) $y = -x^2 + 3x + 10$　※ 展開しても良い。
4. (1) $y = (x+1)^2 + 2$　(2) $y = (x-2)^2 - 2$　(3) $y = -(x+5)^2 + 5$　(4) $y = 2(x-2)^2 - 8$
   (5) $y = -\frac{1}{2}(x-3)^2 + \frac{5}{2}$　(6) $y = -\frac{2}{3}\left(x + \frac{9}{4}\right)^2 + \frac{27}{8}$

5.

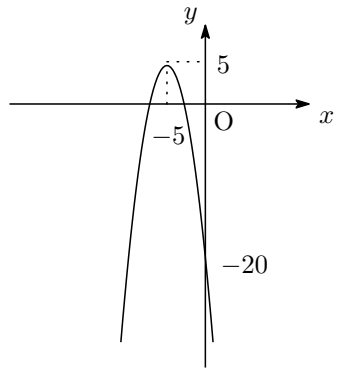
(1)



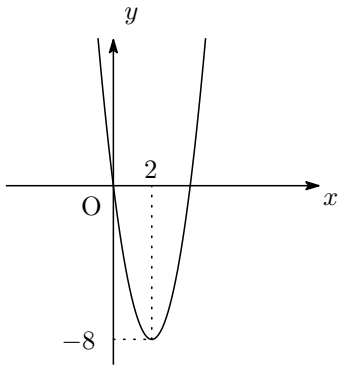
(2)



(3)



(4)



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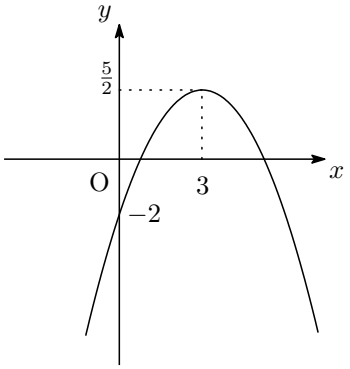

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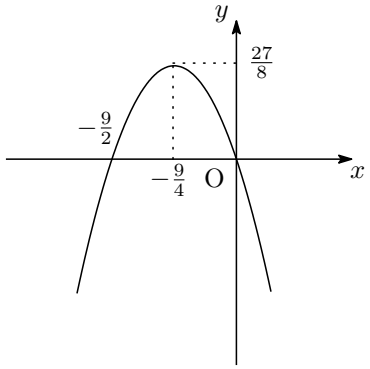
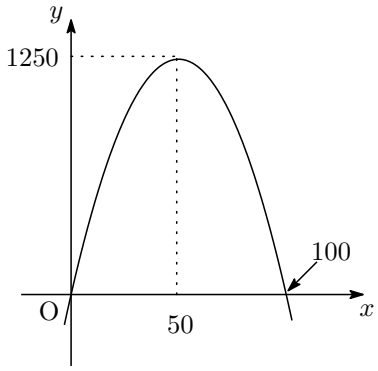


6. (1) $x = -2p + 100$ (2) $p = -\frac{1}{2}x + 50$ (3) $y = -\frac{1}{2}x^2 + 50x$
(4)

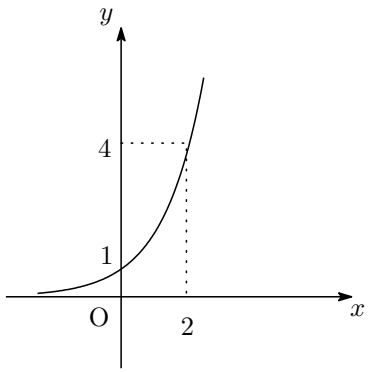


VI. 指数関数と対数関数

1. (1) a^7　(2) a^2　(3) a^8　(4) 1
2. (1) $y = 64$　(2) $y = \frac{1}{8}$　(3) $y = 1$　(4) $y = 2$　(5) $y = \frac{1}{4}$
3. (1) $y = 17$　(2) $y = 5000000$　(3) $y = \frac{4}{25}$　(4) $y = -\frac{1}{64}$　(5) $y = 8$

4.

(1)



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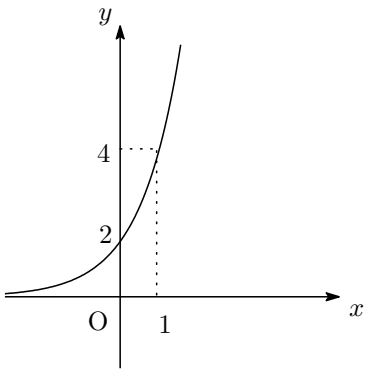
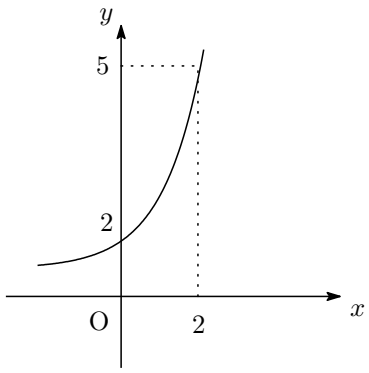


(3)



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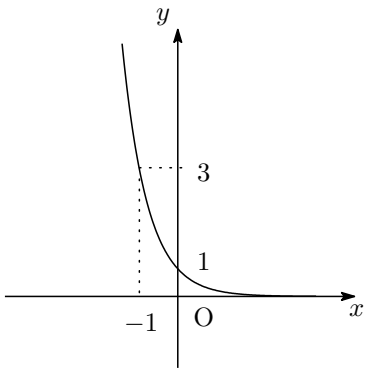

5. (1) 2　(2) 6　(3) 0　(4) -1　(5) -4
6. (1) 2　(2) -2　(3) $\frac{1}{2}$　(4) $\frac{3}{2}$　(5) 1　(6) 2　(7) 1　(5) 2　(6) $-\frac{1}{2}$
7. (1) 50×1.02　(2) 50×1.02^2　(3) 50×1.02^x
   (4) 10 年後 61 万円，20 年後 74 万円，30 年後 91 万円

VII. 微分・積分

1. (1) $y' = 8$　(2) $y' = 4x$　(3) $y' = 2x + 3$　(4) $y' = -15x^2 + 14x - 2$　(5) $y' = \frac{2}{3}x^2 + \frac{1}{3}x + \frac{5}{3}$
   (6) $y' = 2x - 2$　(7) $y' = 2ax - b$
2. (1) $\frac{dS}{dt} = 4t - 4$　(2) $\frac{dR}{dp} = 120 - p$　(3) $\frac{dV}{dh} = sh^2$　(4) $\frac{dy}{da} = 2ax^2 - x + 6a^2$
3. (1) $f'(1) = -3$　(2) $f'(3) = 13$　(3) $f'(-1) = 5$　(4) $f'(\sqrt{2}) = 4 - 4\sqrt{2}$
4. (1) $x = -1$ のとき，極小値 -1
   (2) $x = 2$ のとき，極大値 5
   (3) $x = -1$ のとき，極大値 2，$x = 1$ のとき，極小値 -2
   (4) $x = 1$ のとき，極大値 2，$x = 3$ のとき，極小値 -2
   (5) $x = 1$ のとき，極大値 $\frac{20}{3}$，$x = -3$ のとき，極小値 -4
   (6) $x = \frac{1}{2}$ のとき，極大値 $\frac{17}{144}$，$x = 3$ のとき，極小値 $-\frac{3}{4}$
   (7) $x = -\sqrt{2}$ のとき，極大値 $4\sqrt{2}$，$x = \sqrt{2}$ のとき，極小値 $-4\sqrt{2}$
   (8) $x = 1 - \sqrt{3}$ のとき，極大値 $-12 + 6\sqrt{3}$，$x = 1 + \sqrt{3}$ のとき，極小値 $-12 - 6\sqrt{3}$
5. (1) $y = 2x - 1$　(2) $y = 4x - 9$　(3) $y = -6x + 10$　(4) $y = -x + 4$　(5) $y = \frac{5}{6}x - \frac{1}{3}$
   (6) $y = -4ax - 4a$
6. (1) $\frac{1}{2}x^2 + 3x + C$　(2) $\frac{1}{3}x^3 + 2x^2 + 3x + C$　(3) $\frac{2}{3}t^3 + t^2 - 5t + C$　(4) $\frac{1}{6}y^3 + \frac{a}{2}y^2 + a^2y + C$
7. (1) -2　(2) $\frac{9}{2}$　(3) 32　(4) $-\frac{1}{12}$
8. 50 個の生産