

< 1 ページ. 数の表示 >

問の解答

$$(1) (54)_8 = 40+4 = (44)_{10}$$

$$(2) (237)_8 = 2 \times 64 + 3 \times 8 + 7 \\ = 128 + 24 + 7 \\ = (159)_{10}$$

$$(3) (1111)_2 = 1 + 2 + 4 + 8 \\ = (15)_{10}$$

$$(4) (100000)_2 = 2^5 \\ = (32)_{10}$$

< 2 ページ. 数の分類 >

問の解答

$$(1) \frac{3}{16} = 0.1875$$

$$(2) \frac{5}{9} = 0.5555\dots$$

$$(3) \frac{8}{9} = 0.888\dots$$

$$(4) \frac{23}{99} = 0.23232323\dots$$

< 5 ページ. 文字式の計算1 >

問の解答

$$(1) x \times x \times x + x + x = x^3 + 2x$$

$$(2) 2 \times a \times b \times a - b \times b \times 3 \times a = 2a^2b - 3ab^2$$

$$(3) x \times y \div x \times y = \frac{x \times y \times y}{x} = y^2$$

$$(4) a \times b + b + b + b \times 2 = ab + 2b + 2b = ab + 4b$$

$$(5) 5 \times x - 4 \times y + x \times 3 = 5x - 4y + 3x = 8x - 4y$$

$$(6) a \times b \div a \times a \div b \times c = \frac{a \times b \times a \times c}{a \times b} = ac$$

$$(7) (3x^2y) \times (4xy^3) \div (6x^3y) = \frac{3x^2y \times 4xy^3}{6x^3y} = 2y^3$$

$$(8) (10a^3bc) \div (2abc^3) \times (8ab^2c^3) = \frac{10a^3bc \times 8ab^2c^3}{2abc^3} = 40a^3b^2c$$

< 6 ページ. 文字式の計算 2 >

問の解答

$$(1) (a - b)(a + b) = a^2 - b^2$$

$$(2) (a - b)^2 = a^2 - 2ab + b^2$$

$$(3) (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

$$(4) (a - b)(a^2 + ab + b^2) = a^3 - b^3$$

$$(5) (a + b)(a^2 - ab + b^2) = a^3 + b^3$$

$$(6) (a - b + c)^2 = a^2 + b^2 + c^2 - 2ab + 2ac - 2bc$$

< 7ページ.文字式の計算3 >

問1の解答

$$(1) \frac{5}{4} - \frac{y}{x} = \frac{5x - 4y}{4x}$$

$$(2) \frac{b}{a} + \frac{y}{x} = \frac{bx + ay}{ax}$$

$$(3) \frac{2b}{3a} + \frac{4d}{5c} = \frac{10bc + 12ad}{15ac}$$

$$(4) \frac{x}{a} + \frac{y}{b} + \frac{z}{c} = \frac{bcx + acy + abz}{abc}$$

問2の解答

$$(1) \frac{\frac{b}{a}}{1} = \frac{b}{a} \quad (2) \frac{\frac{1}{y}}{x} = \frac{1}{xy}$$

$$(3) \frac{\frac{1}{a} + \frac{1}{b}}{c} = \frac{\frac{a+b}{ab}}{c} = \frac{a+b}{abc}$$

$$(4) \frac{1 + \frac{1}{x}}{1 + x} = \frac{\frac{1+x}{x}}{1+x} = \frac{1}{x}$$

$$(5) \frac{\frac{1}{a} - \frac{1}{b}}{a - b} = \frac{\frac{b-a}{ab}}{a - b} = -\frac{1}{ab}$$

$$(6) \frac{\frac{1}{abc}}{\frac{1}{a} + \frac{1}{b} + \frac{1}{c}} = \frac{\frac{1}{abc}}{\frac{bc+ac+ab}{abc}} = \frac{1}{bc + ac + ab}$$

< 9 ページ. 整式 2 >

問の解答

$$\begin{aligned}(1) \quad & (3 + 4x - x^2) + (2 + 3x^2 - 5x) \\ & = 2x^2 - x + 5\end{aligned}$$

$$\begin{aligned}(2) \quad & (4x - 5 + 3x^2) - (7 - 6x - 2x^2) \\ & = 3x^2 + 2x^2 + 4x + 6x - 5 - 7 \\ & = 5x^2 + 10x - 12\end{aligned}$$

$$(3) \quad (x - 3)x^2 = x^3 - 3x^2$$

$$\begin{aligned}(4) \quad & (x + 6)(3x - 7) = 3x^2 + 18x - 7x - 42 \\ & = 3x^2 + 11x - 42\end{aligned}$$

< 10 ページ. 整式 3 >

問1の解答

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

$$(2) (x-3)^2 = x^2 - 6x + 9$$

$$(3) (x+a)^2 = x^2 + 2ax + a^2$$

$$(4) (x-a)^2 = x^2 - 2ax + a^2$$

$$(5) (x-a)(x+a) = x^2 - a^2$$

$$(6) (x+a)(x+b) = x^2 + (a+b)x + ab$$

$$(7) (x+a)(x-b) = x^2 + (a-b)x - ab$$

$$(8) (x+a)^3 = x^3 + 3ax^2 + 3a^2x + a^3$$

$$(9) (x-a)^3 = x^3 - 3ax^2 + 3a^2x - a^3$$

$$(10) (ax+b)(cx+d) = acx^2 + (ad+bc)x + bd$$

$$(11) (ax+b)(cx-d) = acx^2 + (bc-ad)x - bd$$

$$(12) (ax-b)(cx-d) = acx^2 - (bc+ad)x + bd$$

$$(13) (x-a)(x^2+ax+a^2) = x^3 - a^3$$

$$(14) (x+a)(x^2-ax+a^2) = x^3 + a^3$$

$$(15) (x-1)(x+1)(x^2+1) = x^4 - 1$$

$$(16) (x-a)(x+a)(x^2+a^2) = x^4 - a^4$$

< 11 ページ. 因数分解 >

問の解答

$$(1) x^2 + 10x + 25 = (x + 5)^2$$

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

$$(3) x^2 - 16 = (x - 4)(x + 4)$$

$$(4) 3x^2 + 17x + 10 = (3x + 2)(x + 5)$$

$$(5) x^3 - 27 = (x - 3)(x^2 + 3x + 9)$$

$$(6) x^3 + 6x^2 + 12x + 8 = (x + 2)^3$$

$$(7) x^2 - 2ax + a^2 = (x - a)^2$$

$$(8) x^2 + (a - b)x - ab = (x + a)(x - b)$$

$$(9) x^2 - (a + b)x + ab = (x - a)(x - b)$$

$$(10) acx^2 - (ac + bc)x + bd = (ax - b)(cx - d)$$

$$(11) x^3 + a^3 = (x + a)(x^2 - ax + a^2)$$

$$(12) x^3 - 3ax^2 + 3a^2x - a^3 = (x - a)^3$$

< 12ページ. 整式の除法 >

問の解答

$$(1) \frac{2x^2 + 4x}{x + 1} = 2x + 2 - \frac{2}{x + 1}$$

$$(2) \frac{x^2 + 4x - 6}{x - 2} = x + 6 + \frac{6}{x - 2}$$

$$(3) \frac{2x^2 + 3x - 1}{x - 2} = 2x + 1 + \frac{4}{x - 1}$$

$$(4) \frac{x^3 + 5x^2 - 6x + 4}{x - 3} = x^2 + 8x + 18 + \frac{58}{x - 3}$$

< 13 ページ. 平方根 1 >

問1の解答

$$(1) \sqrt{121} = 11 \quad (2) \sqrt{\frac{36}{49}} = \frac{6}{7}$$

$$(3) \sqrt{0.25} = \sqrt{\frac{1}{4}} = \frac{1}{2}$$

問2の解答

$$(1) \sqrt{3} \times \sqrt{12} = \sqrt{36} = 6$$

$$(2) \sqrt{8} \times \sqrt{18} = \sqrt{2^3 \times 2 \times 3^2} = \sqrt{4^2 \times 3^2} = 4 \times 3 = 12$$

$$(3) \sqrt{72} = \sqrt{8 \times 9} = 6\sqrt{2}$$

$$(4) \sqrt{98} = \sqrt{2 \times 7^2} = 7\sqrt{2}$$

問3の解答

$$(1) \frac{\sqrt{72}}{\sqrt{2}} = \sqrt{36} = 6 \quad (2) \frac{\sqrt{24}}{\sqrt{3}} = \sqrt{8} = 2\sqrt{2}$$

$$(3) \frac{\sqrt{200}}{\sqrt{8}} = \sqrt{\frac{200}{8}} = \sqrt{25} = 5$$

$$(4) \frac{\sqrt{2} \times \sqrt{24}}{\sqrt{3}} = \sqrt{\frac{2 \times 24}{3}} = \sqrt{2 \times 8} = 4$$

< 14 ページ. 平方根 2 >

問1の解答

$$(1) (1 + \sqrt{3})^2 = 1 + 2\sqrt{3} + 3 = 4 + 2\sqrt{3}$$

$$(2) (\sqrt{3} + \sqrt{5})^2 = 3 + 2\sqrt{15} + 5 = 8 + 2\sqrt{15}$$

$$(3) (2 - \sqrt{2})^2 = 4 - 4\sqrt{2} + 2 = 6 - 4\sqrt{2}$$

$$(4) (\sqrt{6} - \sqrt{3})^2 = 6 - 2\sqrt{18} + 3 = 9 - 6\sqrt{2}$$

$$(5) (\sqrt{7} + \sqrt{3})(\sqrt{7} - \sqrt{3}) = 7 - 3 = 4$$

$$(6) (5 + \sqrt{2})(5 - \sqrt{2}) = 25 - 2 = 23$$

問2の解答

$$(1) \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \quad (2) \frac{\sqrt{5}}{\sqrt{3}} = \frac{\sqrt{15}}{3} \quad (3) \frac{4}{\sqrt{2}} = 2\sqrt{2}$$

$$(4) \frac{12}{\sqrt{6}} = 2\sqrt{6} \quad (5) \frac{4}{\sqrt{8}} = \frac{4}{2\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$$

問3の解答

$$(1) \frac{1}{\sqrt{5} + 2} = \frac{\sqrt{5} - 2}{5 - 4} = \sqrt{5} - 2$$

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

$$(3) \frac{3}{\sqrt{5} + \sqrt{2}} = \frac{3(\sqrt{5} - \sqrt{2})}{5 - 2} = \sqrt{5} - \sqrt{2}$$

$$(4) \frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}} = \frac{(\sqrt{5} + \sqrt{2})^2}{5 - 2} = \frac{5 + 2\sqrt{10} + 2}{3} = \frac{7 + 2\sqrt{10}}{3}$$

< 15 ページ.2次方程式 >

問の解答

$$(1) \quad x^2 - 5x + 4 = 0$$
$$\underline{x = 1, x = 4}$$

$$(2) \quad 2x^2 - 2x - 4 = 0$$
$$x^2 - x - 2 = 0$$
$$(x + 1)(x - 2) = 0$$
$$\underline{x = -1, x = 2}$$

$$(3) \quad x^2 + 3x - 4 = 0$$
$$(x + 4)(x - 1) = 0$$
$$\underline{x = 1, x = -4}$$

$$(4) \quad 2x^2 - 5x - 3 = 0$$
$$(2x + 1)(x - 3) = 0$$
$$\underline{x = 3, x = -\frac{1}{2}}$$

$$(5) \quad x^2 + x - 1 = 0$$
$$x = \frac{-1 \pm \sqrt{1 + 4}}{2}$$
$$\underline{x = \frac{-1 \pm \sqrt{5}}{2}}$$

$$(6) \quad 2x^2 + x - 3 = 0$$
$$(2x + 3)(x - 1) = 0$$
$$\underline{x = 1, x = -\frac{3}{2}}$$

< 16 ページ. 累乗根 >

問の解答

$$(1) \sqrt{121} = 11$$

$$(2) \sqrt[3]{0.027} = \sqrt[3]{\frac{27}{1000}} = \frac{3}{10}$$

$$(3) \sqrt[4]{\frac{16}{81}} = \frac{2}{3}$$

$$(4) \sqrt[5]{7 + \frac{19}{32}} = \sqrt[5]{\frac{243}{32}} = \frac{3}{2}$$

< 17ページ. 整数指数 >

問の解答

$$(1) 9^0 = 1$$

$$(2) 2^{-3} = \frac{1}{8}$$

$$(3) 3^5 \times 9^{-2} = 3^{5-4} = 3$$

$$(4) (3^3)^{-2} = 3^{-6} = \frac{1}{729}$$

< 18 ページ. 分数指数 >

問の解答

$$(1) 169^{\frac{1}{2}} = 13$$

$$(2) 64^{\frac{2}{3}} = 4^2 = 16$$

$$(3) 36^{\frac{3}{2}} = 6^3 = 216$$

$$\begin{aligned}(4) (0.008)^{\frac{5}{3}} &= \left(\frac{8}{1000}\right)^{\frac{5}{3}} = \left(\frac{2}{10}\right)^5 \\ &= \frac{32}{100000} \left(= \left(\frac{1}{5}\right)^5\right) \\ &= 0.00032 \left(= \frac{1}{3125}\right)\end{aligned}$$

< 19 ページ. 指数法則 >

問1の解答

$$1^\circ : a^p \times a^q = a^{\boxed{p+q}}$$

$$2^\circ : a^p \div a^q = a^{\boxed{p-q}}$$

$$3^\circ : (a^p)^q = a^{\boxed{pq}}$$

問2の解答

$$(1) \sqrt{\sqrt[3]{64}} = 64^{\frac{1}{6}} = 2$$

$$\begin{aligned}(2) (16 \times 25)^{\frac{1}{3}} \times (4 \times 25 \times 25)^{\frac{1}{3}} &= (4^2 \times 5^2)^{\frac{1}{3}} \times (4 \times 5^4)^{\frac{1}{3}} \\ &= 4^{\frac{2}{3} + \frac{1}{3}} \times 5^{\frac{2}{3} + \frac{4}{3}} \\ &= 4^1 \times 5^2 = 100\end{aligned}$$

$$\begin{aligned}(3) 12^{\frac{1}{3}} \times 18^{\frac{1}{3}} &= (2^2 \times 3)^{\frac{1}{3}} \times (2 \times 3^2)^{\frac{1}{3}} \\ &= (2^2 \times 2)^{\frac{1}{3}} \times (3 \times 3^2)^{\frac{1}{3}} \\ &= 2 \times 3 = 6\end{aligned}$$

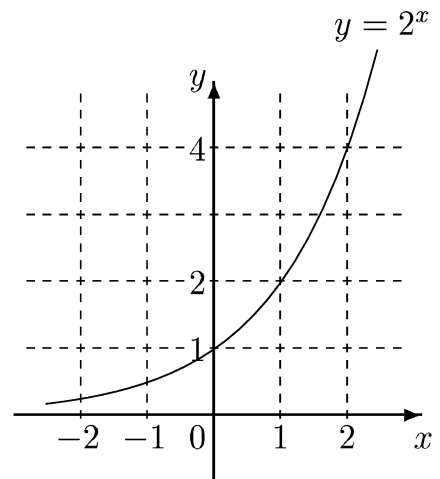
$$\begin{aligned}(4) \sqrt[4]{54} \times \sqrt[4]{24} &= (2 \times 3^3)^{\frac{1}{4}} \times (2^3 \times 3)^{\frac{1}{4}} \\ &= (2 \times 2^3)^{\frac{1}{4}} \times (3^3 \times 3)^{\frac{1}{4}} \\ &= 2 \times 3 = 6\end{aligned}$$

< 20 ページ. 指数関数 >

問の解答

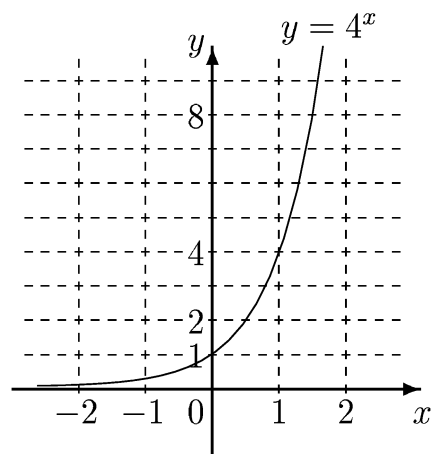
(1) $y = 2^x$

x	-2	-1	0	$\frac{1}{2}$	1	2
y	$\frac{1}{4}$	$\frac{1}{2}$	1	$\sqrt{2}$	2	4



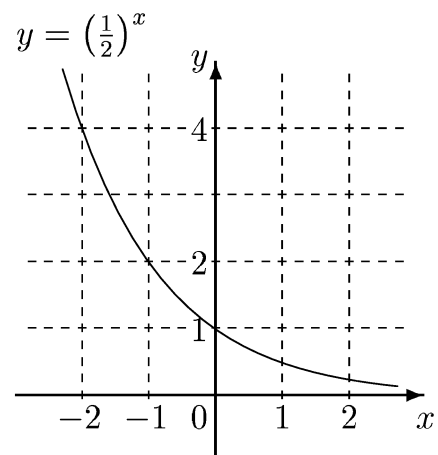
(2) $y = 4^x$

x	-1	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	$\frac{3}{2}$
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8



(3) $y = \left(\frac{1}{2}\right)^x$

x	-2	-1	0	1	2
y	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$



< 21 ページ. 対数 1 >

問1の解答

$$(1) 3^{\frac{1}{2}} = \sqrt{3}$$

$$\log_3 \sqrt{3} = \frac{1}{2}$$

$$(2) 10^{-1} = 0.1$$

$$\log_{10} 0.1 = -1$$

$$(3) 5 = \log_2 32$$

$$2^5 = 32$$

$$(4) \frac{2}{3} = \log_8 4$$

$$8^{\frac{2}{3}} = 4$$

問2の解答

$$(1) \log_2 64 = 6$$

$$(2) \log_5 125 = 3$$

$$(3) \log_{10} 10000 = 4$$

$$(4) \log_6 216 = 3$$

< 22 ページ. 対数 2 >

問1の解答

$$(1) \log_2 32 = 5$$

$$(5) \log_3 81 = 4$$

$$(2) \log_3 \sqrt{3} = \frac{1}{2}$$

$$(6) \log_4 0.25 = -1$$

$$(3) \log_5 0.2 = -1$$

$$(7) \log_5 \sqrt[3]{5} = \frac{1}{3}$$

$$(4) \log_3 (9\sqrt{3}) = \log_3 (3^{2+\frac{1}{2}})$$
$$= \frac{5}{2}$$

$$(8) \log_6 \sqrt[3]{36} = \frac{2}{3}$$

$$(9) \log_4 8 = \frac{3}{2}$$

問2の解答

$$(1) \log_6 12 + \log_6 3 = \log_6 36 = 2$$

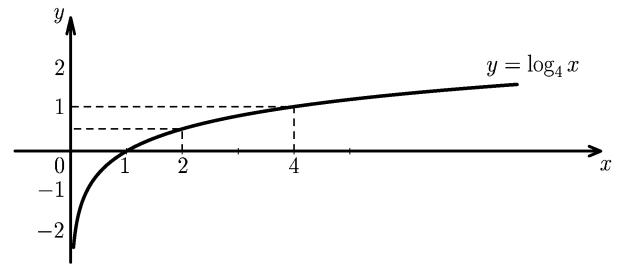
$$(2) \log_{10} 200 - \log_{10} 100 + \log_{10} 500 = \log_{10} \left(\frac{200 \times 500}{100} \right)$$
$$= \log_{10} 1000$$
$$= 3$$

< 23 ページ. 対数関数 >

問の解答

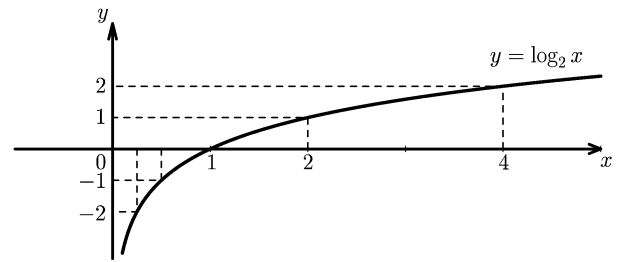
(1) $y = \log_4 x \quad (x > 0)$

x	0.25	1	$\sqrt{4}$	4
y	-1	0	$\frac{1}{2}$	1



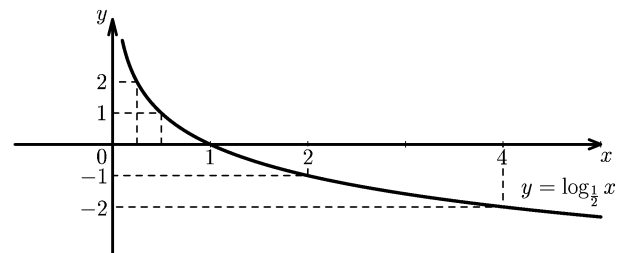
(2) $y = \log_2 x \quad (x > 0)$

x	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4
y	-2	-1	0	1	2



(3) $y = \log_{\frac{1}{2}} x \quad (x > 0)$

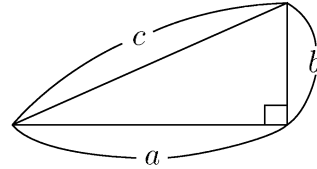
x	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4
y	2	1	0	-1	-2



< 24 ページ. 直角三角形 >

問1の解答

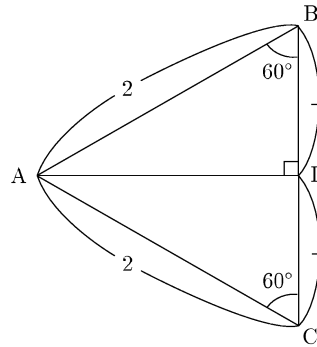
$$c = \sqrt{a^2 + b^2}$$



(図1)

問2の解答

$$AD = \sqrt{3}$$

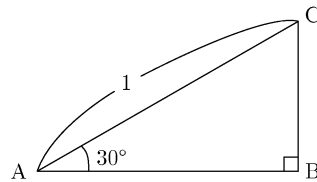


(図2)

問3の解答

$$AB = \frac{\sqrt{3}}{2}$$

$$BC = \frac{1}{2}$$

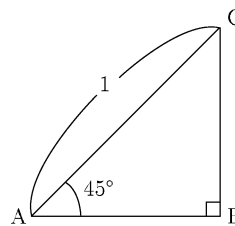


(図3)

問4の解答

$$AB = \frac{\sqrt{2}}{2}$$

$$BC = \frac{\sqrt{2}}{2}$$



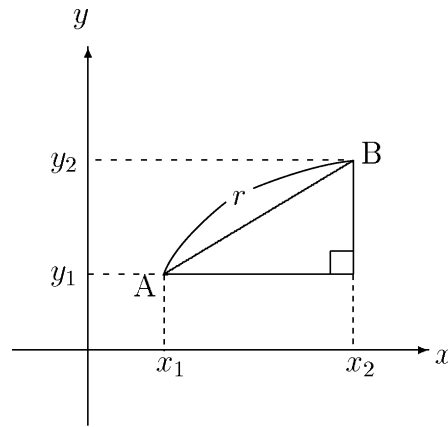
(図4)

< 25 ページ. 平面上の距離と円の方程式 >

問1の解答

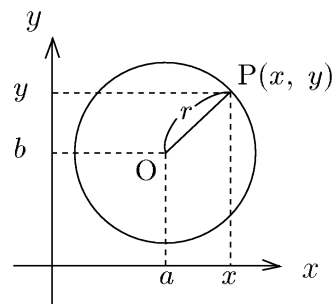
(解)

$$r^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$



問2の解答

$$(x-a)^2 + (y-b)^2 = \boxed{r^2}$$



問3の解答

$$(1) (x-1)^2 + (y-2)^2 = 4$$

(答) 中心 (1, 2)、半径 = 2

$$(2) (x+2)^2 + y^2 = 121$$

(答) 中心 (-2, 0)、半径 = 11

$$(3) x^2 + y^2 = 25$$

(答) 中心 (0, 0)、半径 = 5

< 26 ページ. 三角比 >

問の解答

$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\cos 45^\circ = \frac{\sqrt{2}}{2}$$

$$\tan 45^\circ = 1$$

< 27ページ. 三角関数の定義 >

問の解答

$$(1) \sin 180^\circ = 0$$

$$\cos 180^\circ = -1$$

$$\tan 180^\circ = 0$$

$$(2) \sin 270^\circ = -1$$

$$\cos 270^\circ = 0$$

< 28 ページ. 三角関数の値 1 >

問1の解答

$$(1) \cos 30^\circ = \frac{\sqrt{3}}{2} \quad (2) \sin 30^\circ = \frac{1}{2} \quad (3) \tan 30^\circ = \frac{\sqrt{3}}{3}$$

問2の解答

$$(1) \cos 60^\circ = \frac{1}{2} \quad (2) \sin 60^\circ = \frac{\sqrt{3}}{2} \quad (3) \tan 60^\circ = \sqrt{3}$$

問3の解答

$$(1) \cos 45^\circ = \frac{\sqrt{2}}{2} \quad (2) \sin 45^\circ = \frac{\sqrt{2}}{2} \quad (3) \tan 45^\circ = 1$$

問4の解答

$$(1) \cos 135^\circ = -\frac{\sqrt{2}}{2}, \sin 135^\circ = \frac{\sqrt{2}}{2}, \tan 135^\circ = -1$$

$$(2) \cos 225^\circ = -\frac{\sqrt{2}}{2}, \sin 225^\circ = -\frac{\sqrt{2}}{2}, \tan 225^\circ = 1$$

$$(3) \cos 315^\circ = \frac{\sqrt{2}}{2}, \sin 315^\circ = -\frac{\sqrt{2}}{2}, \tan 315^\circ = -1$$

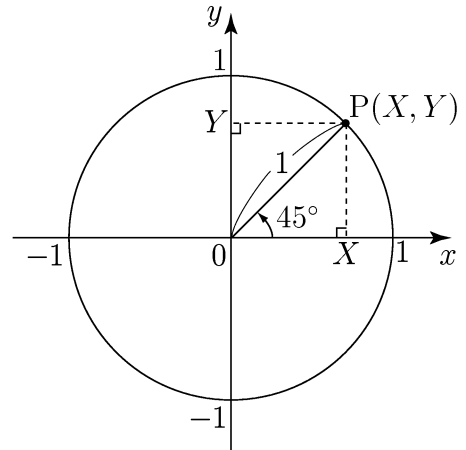
< 28 ページ. 三角関数の値 1 >

問3の解答

$$(1) \cos 45^\circ = \frac{\sqrt{2}}{2}$$

$$(2) \sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$(3) \tan 45^\circ = 1$$

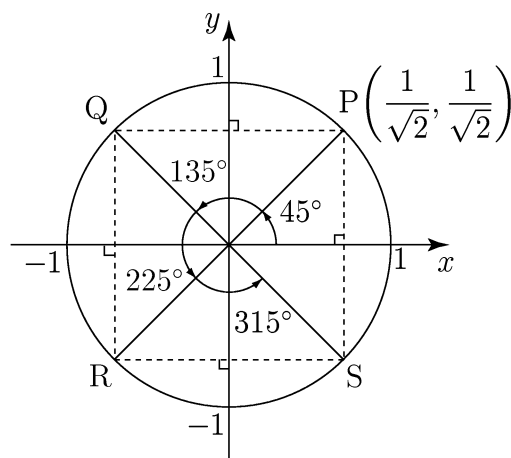


問4の解答

$$(1) \cos 135^\circ = -\frac{\sqrt{2}}{2}, \sin 135^\circ = \frac{\sqrt{2}}{2}, \tan 135^\circ = -1$$

$$(2) \cos 225^\circ = -\frac{\sqrt{2}}{2}, \sin 225^\circ = -\frac{\sqrt{2}}{2}, \tan 225^\circ = 1$$

$$(3) \cos 315^\circ = \frac{\sqrt{2}}{2}, \sin 315^\circ = -\frac{\sqrt{2}}{2}, \tan 315^\circ = -1$$



< 29 ページ. 三角関数の値 2 >

問1の解答

$$(1) \cos 150^\circ = -\frac{\sqrt{3}}{2}, \sin 150^\circ = \frac{1}{2}, \tan 150^\circ = -\frac{\sqrt{3}}{3}$$

$$(2) \cos 210^\circ = -\frac{\sqrt{3}}{2}, \sin 210^\circ = -\frac{1}{2}, \tan 210^\circ = \frac{\sqrt{3}}{3}$$

$$(3) \cos 330^\circ = \frac{\sqrt{3}}{2}, \sin 330^\circ = -\frac{1}{2}, \tan 330^\circ = -\frac{\sqrt{3}}{3}$$

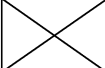
問2の解答

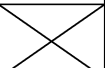
$$(1) \cos 120^\circ = -\frac{1}{2}, \sin 120^\circ = \frac{\sqrt{3}}{2}, \tan 120^\circ = -\sqrt{3}$$

$$(2) \cos 240^\circ = -\frac{1}{2}, \sin 240^\circ = -\frac{\sqrt{3}}{2}, \tan 240^\circ = \sqrt{3}$$

$$(3) \cos 300^\circ = \frac{1}{2}, \sin 300^\circ = -\frac{\sqrt{3}}{2}, \tan 300^\circ = -\sqrt{3}$$

問3の解答

角度 θ	0°	30°	45°	60°	90°	120°	135°	150°
$\sin \theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$
$\tan \theta$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$		$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$

	180°	210°	225°	240°	270°	300°	315°	330°	360°
	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0
	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$		$-\sqrt{3}$	-1	$-\frac{\sqrt{3}}{3}$	0

< 30 ページ. 一般角 >

問の解答

$$(1) \sin 570^\circ = \sin 210^\circ$$

$$(2) \cos(-45^\circ) = \cos 315^\circ$$

$$(3) \tan 765^\circ = \tan 45^\circ$$

< 31 ページ. 三角関数の性質 1 >

問1の解答

$$(1) \sin(\theta + 180^\circ) = -\sin \theta$$

$$(2) \cos(\theta + 180^\circ) = -\cos \theta$$

$$(3) \tan(\theta + 180^\circ) = \tan \theta$$

問2の解答

$$(1) \sin(-\theta) = -\sin \theta$$

$$(2) \cos(-\theta) = \cos \theta$$

$$(3) \tan(-\theta) = -\tan \theta$$

< 32 ページ. 三角関数の性質 2 >

問1の解答

$$(1) \sin(90^\circ - \theta) = \cos \theta$$

$$(2) \cos(90^\circ - \theta) = \sin \theta$$

問2の解答

$$(1) \sin 200^\circ = -\sin 20^\circ = -0.342$$

$$\cos 200^\circ = -\cos 20^\circ = -0.9397$$

$$\tan 200^\circ = \tan 20^\circ = 0.364$$

$$(2) \sin(-20^\circ) = -\sin 20^\circ = -0.342$$

$$\cos(-20^\circ) = \cos 20^\circ = 0.9397$$

$$\tan(-20^\circ) = -\tan 20^\circ = -0.364$$

$$(3) \sin 70^\circ = \cos 20^\circ = 0.9397$$

$$\cos 70^\circ = \sin 20^\circ = 0.342$$

$$(4) \sin 110^\circ = \sin(180^\circ - 70^\circ) = \sin 70^\circ = 0.9397$$

< 33 ページ. 三角関数の性質 3 >

問1の解答

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

問2の解答

θ	第1象限	第2象限	第3象限	第4象限
$\sin \theta$	+	+	-	-
$\cos \theta$	+	-	-	+
$\tan \theta$	+	-	+	-

問3の解答

$$\sin^2 \theta = 1 - \cos^2 \theta = 1 - \left(\frac{2}{5}\right)^2 = 1 - \frac{4}{25} = \frac{21}{25}$$

$$\sin \theta = \pm \sqrt{\frac{21}{25}} = \pm \frac{\sqrt{21}}{5}$$

< 34 ページ. 極座標 >

問の解答

$$(1) (2, 2) = (2\sqrt{2} \cos 45^\circ, 2\sqrt{2} \sin 45^\circ)$$

$$(2) (\sqrt{2}, -\sqrt{2}) = (2 \cos(-45^\circ), 2 \sin(-45^\circ)) \\ = (2 \cos 315^\circ, 2 \sin 315^\circ)$$

$$(3) (-\sqrt{3}, 1) = (2 \cos 150^\circ, 2 \sin 150^\circ)$$

$$(4) (2\sqrt{3}, -2) = (4 \cos(-30^\circ), 4 \sin(-30^\circ)) \\ = (4 \cos 330^\circ, 4 \sin 330^\circ)$$

< 35 ページ. 余弦定理 1 >

問の解答

$$(1) \quad P(a, 0)$$

$$Q(b \cos \theta, b \sin \theta)$$

$$(2) \quad PQ^2 = (b \cos \theta - a)^2 + (b \sin \theta)^2$$

$$(3) \quad PQ^2 = b^2 \cos^2 \theta - 2ab \cos \theta + a^2 + b^2 \sin^2 \theta \\ = a^2 + b^2 - 2ab \cos \theta$$

$$(4) \quad c^2 = a^2 + b^2 - 2ab \cos \theta$$

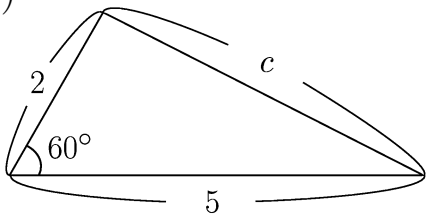
< 36 ページ. 余弦定理 2 >

問1の解答

$$c^2 = a^2 + b^2 - 2ab \cos \theta$$

問2の解答

(1)

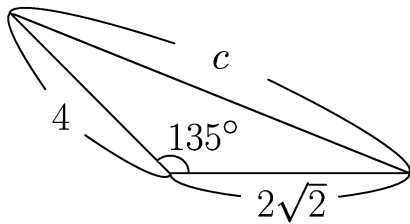


$$c^2 = 5^2 + 2^2 - 2 \times 5 \times 2 \times \cos 60^\circ$$

$$= 25 + 4 - 10 = 19$$

$$c = \sqrt{19}$$

(2)



$$c^2 = (2\sqrt{2})^2 + (4)^2 - 2 \times 2\sqrt{2} \times 4 \times \cos(135^\circ)$$

$$= 8 + 16 + 16 = 40$$

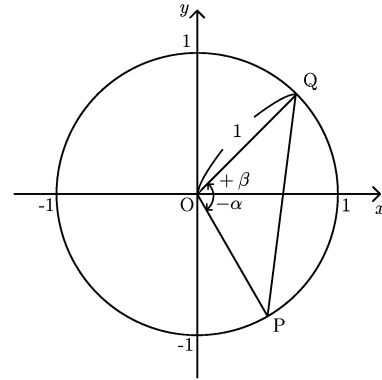
$$c = \sqrt{40} = 2\sqrt{10}$$

< 37 ページ. 加法定理 1 >

問の解答

(1) $Q(\cos \beta, \sin \beta)$

(2) $P(\cos \alpha, -\sin \alpha)$

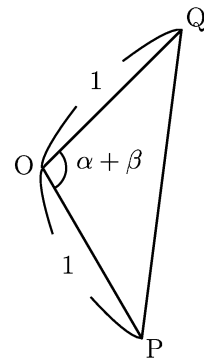


(3) $PQ^2 = (\cos \beta - \cos \alpha)^2 + (\sin \beta + \sin \alpha)^2$

(4) $PQ^2 = \cos^2 \beta - 2 \cos \alpha \cos \beta + \cos^2 \alpha$
 $+ \sin^2 \beta + 2 \sin \alpha \sin \beta + \sin^2 \alpha$
 $= 2 - 2 \cos \alpha \cos \beta + 2 \sin \alpha \sin \beta$

(5) $PQ^2 = 1^2 + 1^2 - 2 \times 1 \times 1 \times \cos(\alpha + \beta)$
 $= 2 - 2 \cos(\alpha + \beta)$

(6) $\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$



< 38 ページ. 加法定理 2 >

問の解答

$$\begin{aligned}\cos 165^\circ &= \cos 120^\circ \cos 45^\circ - \sin 120^\circ \sin 45^\circ \\ &= -\frac{1}{2} \times \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2} \\ &= -\frac{\sqrt{2} + \sqrt{6}}{4}\end{aligned}$$

$$\begin{aligned}\sin 165^\circ &= \sin 120^\circ \cos 45^\circ + \cos 120^\circ \sin 45^\circ \\ &= \frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2} + \left(-\frac{1}{2}\right) \times \frac{\sqrt{2}}{2} \\ &= \frac{\sqrt{6} - \sqrt{2}}{4}\end{aligned}$$

< 39 ページ. 加法定理 3 >

問1の解答

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

問2の解答

$$\begin{aligned} (1) \quad \cos 195^\circ &= \cos(120^\circ + 75^\circ) \\ &= \cos 120^\circ \cos 75^\circ - \sin 120^\circ \sin 75^\circ \\ &= -\frac{1}{2} \times \frac{\sqrt{6} - \sqrt{2}}{4} - \frac{\sqrt{3}}{2} \times \frac{\sqrt{6} + \sqrt{2}}{4} \\ &= -\frac{\sqrt{2} + \sqrt{6}}{4} \end{aligned}$$

$$\begin{aligned} (2) \quad \sin 195^\circ &= \sin(120^\circ + 75^\circ) \\ &= \sin 120^\circ \cos 75^\circ + \cos 120^\circ \sin 75^\circ \\ &= \frac{\sqrt{3}}{2} \times \frac{\sqrt{6} - \sqrt{2}}{4} - \frac{1}{2} \times \frac{\sqrt{6} + \sqrt{2}}{4} \\ &= \frac{\sqrt{2} - \sqrt{6}}{4} \end{aligned}$$

問3の解答

$$(1) \quad \cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

$$(2) \quad \sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$$

< 40 ページ. 加法定理 4 >

問 1 の解答

$$\begin{aligned}\tan 165^\circ &= \tan(120^\circ + 45^\circ) = \frac{\tan 120^\circ + \tan 45^\circ}{1 - \tan 120^\circ \tan 45^\circ} \\ &= \frac{-\sqrt{3} + 1}{1 - (-\sqrt{3}) \times 1} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}} \\ &= \frac{(1 - \sqrt{3})^2}{1 - 3} = \frac{1 - 2\sqrt{3} + 3}{-2} \\ &= \frac{4 - 2\sqrt{3}}{-2} = -2 + \sqrt{3}\end{aligned}$$

問 2 の解答

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$$