Zadanie 4. (0–1)

Dla każdej dodatniej liczby b wyrażenie $\left(\sqrt[2]{b} \cdot \sqrt[4]{b}\right)^{\frac{1}{3}}$ jest równe

A. b^2 **B.** $b^{0,25}$ **C.** $b^{\frac{8}{3}}$ **D.** $b^{\frac{4}{3}}$

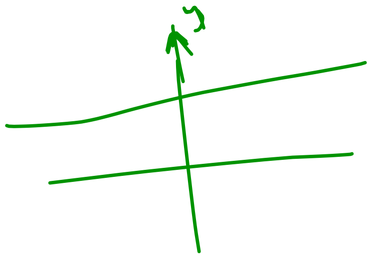
$w = \left(b^{\frac{1}{2}} \cdot b^{\frac{1}{4}}\right)^{\frac{1}{3}} = b^{\frac{1}{6}} \cdot b^{\frac{1}{12}} = b^{\frac{2}{12}+\frac{1}{12}} = b^{\frac{3}{12}} = b^{\frac{1}{4}}$

Zadanie 8. (0–1)

$y = a'x + b'$ $a' = 0 \iff a - 1 = 0$ $\boxed{a = 1}$

Funkcja liniowa $f(x) = (a-1)x + 3$ osiąga wartość najmniejszą równą 3. Wtedy

A. $a = -1$ **B.** $a = 0$ **C.** $a = 1$ **D.** $a = 3$



$f(x) = 3$

D: $x \in \mathbb{R}$

ZW: $y \in \{3\}$

MZ: brak.

mt: stała

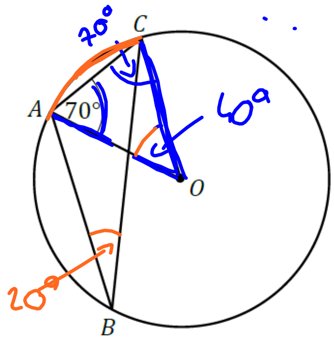
min: min. 1A.

$y > 0 \iff x \in \mathbb{R}$

$y < 1 \Rightarrow x \in \emptyset$

Zadanie 13. (0–1)

Trójkąt ABC jest wpisany w okrąg o środku O. Miara kąta CAO jest równa 70° (zobacz rysunek). Wtedy miara kąta ABC jest równa



A. 20°

B. 25°

C. 30°

D. 35°

Zadanie 18. (0–1)

Końcami odcinka PR są punkty $P = (4,7)$ i $R = (-2,-3)$. Odległość punktu $T = (3,-1)$ od środka odcinka PR jest równa

A. $\sqrt{3}$ **B.** $\sqrt{13}$ **C.** $\sqrt{17}$ **D.** $6\sqrt{2}$

$S(1,2)$

$\left(\frac{4+(-2)}{2}, \frac{7+(-3)}{2}\right)$

$||$

$S\left(\frac{x_A+x_B}{2}, \frac{y_A+y_B}{2}\right) = \left(\frac{x_P+x_R}{2}, \frac{y_P+y_R}{2}\right)$

$|TS| = \sqrt{(x_S-x_T)^2+(y_S-y_T)^2}$

$\sqrt{(1-3)^2+(2-(-1))^2} = \sqrt{13}$

$(4,7)\ P$

$(-2,-3)\ R$

$T(3,-1)$

$\boxed{\text{TAB str 4}}$

Zadanie 2. (0–1)

Liczba $2\log_5 4 - 3\log_5 \frac{1}{2}$ jest równa

A. $-\log_5 \frac{7}{2}$ **B.** $7\log_5 2$ **C.** $-\log_5 2$ **D.** $\log_5 2$

$a>0$, $a\neq 1$, $b>0$

$n\log_a b = \log_a b^n$

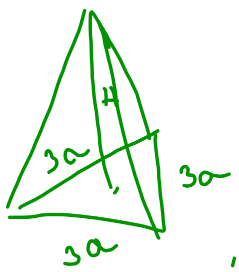
$4\log_5 2 + 3\log_5 2 = 7\log_5 2$

$\log_5 4^2 - \log_5 \left(\frac{1}{2}\right)^3 = \log_5 \left(\frac{4^2}{\left(\frac{1}{2}\right)^3}\right) = \log_5 2^7 = 7\log_5 2$

Zadanie 25. (0–1)

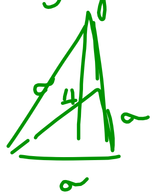
Ostrosłupy prawidłowe trójkątne O_1 i O_2 mają takie same wysokości. Długość krawędzi podstawy ostrosłupa O_1 jest trzy razy dłuższa od długości krawędzi podstawy ostrosłupa O_2. Stosunek objętości ostrosłupa O_1 do objętości ostrosłupa O_2 jest równy

A. $3:1$ **B.** $1:3$ **C.** $9:1$ **D.** $1:9$



$P = \frac{a^2\sqrt{3}}{4}$

$V_1 = \frac{1}{3}P_p \cdot H = \frac{1}{3}\cdot\frac{9a^2\sqrt{3}}{4}\cdot H$



$V_2 = \frac{1}{3}\cdot\frac{a^2\sqrt{3}}{4}\cdot H$

$\frac{V_1}{V_2} = 9:1$

Zadanie 26. (0–1)

Wszystkich liczb naturalnych trzycyfrowych parzystych, w których cyfra 7 występuje dokładnie jeden raz, jest

A. 85 B. 90 C. 100 D. 150

121

1 2 3 4 5 6 7

7

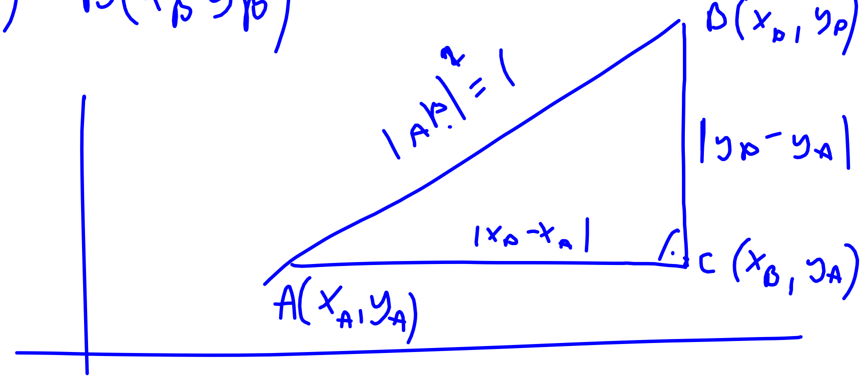
$\underline{1} \cdot \underline{9} \cdot \underline{5}$ (0, 2, 4, 6, 8) $= 1 \cdot 9 \cdot 5$

$+$

$\underline{8}\ \underline{1}\ \underline{5} = 8 \cdot 1 \cdot 5$

$A = 9 \cdot 5 + 8 \cdot 5 = 17 \cdot 5 = 85$

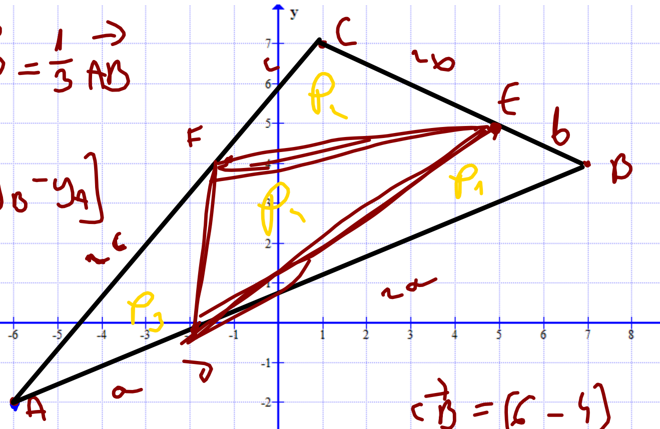
$A(x_A, y_A)$ $B(x_B, y_B)$



$$\frac{AD}{DB} = \frac{1}{2} \Rightarrow \vec{AD} = \frac{1}{3}\vec{AB}$$

$$\vec{AB} = [x_B - x_A ; y_B - y_A] = [12, 6]$$

$$\frac{P_{DEF}}{P_{ABC}} =$$



$$\vec{CB} = [6, -4]$$

$$\vec{BC} = [-6, 4]$$

$$D = A + \vec{AD} = ($$

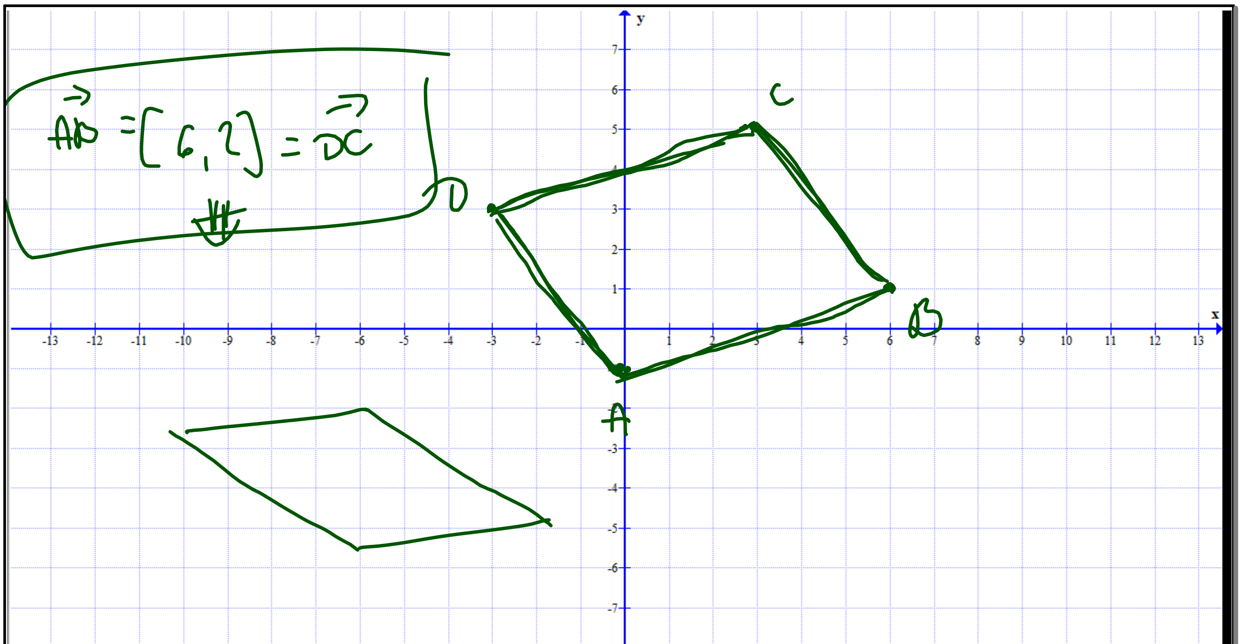
$$P = \frac{1}{2} a \cdot h$$

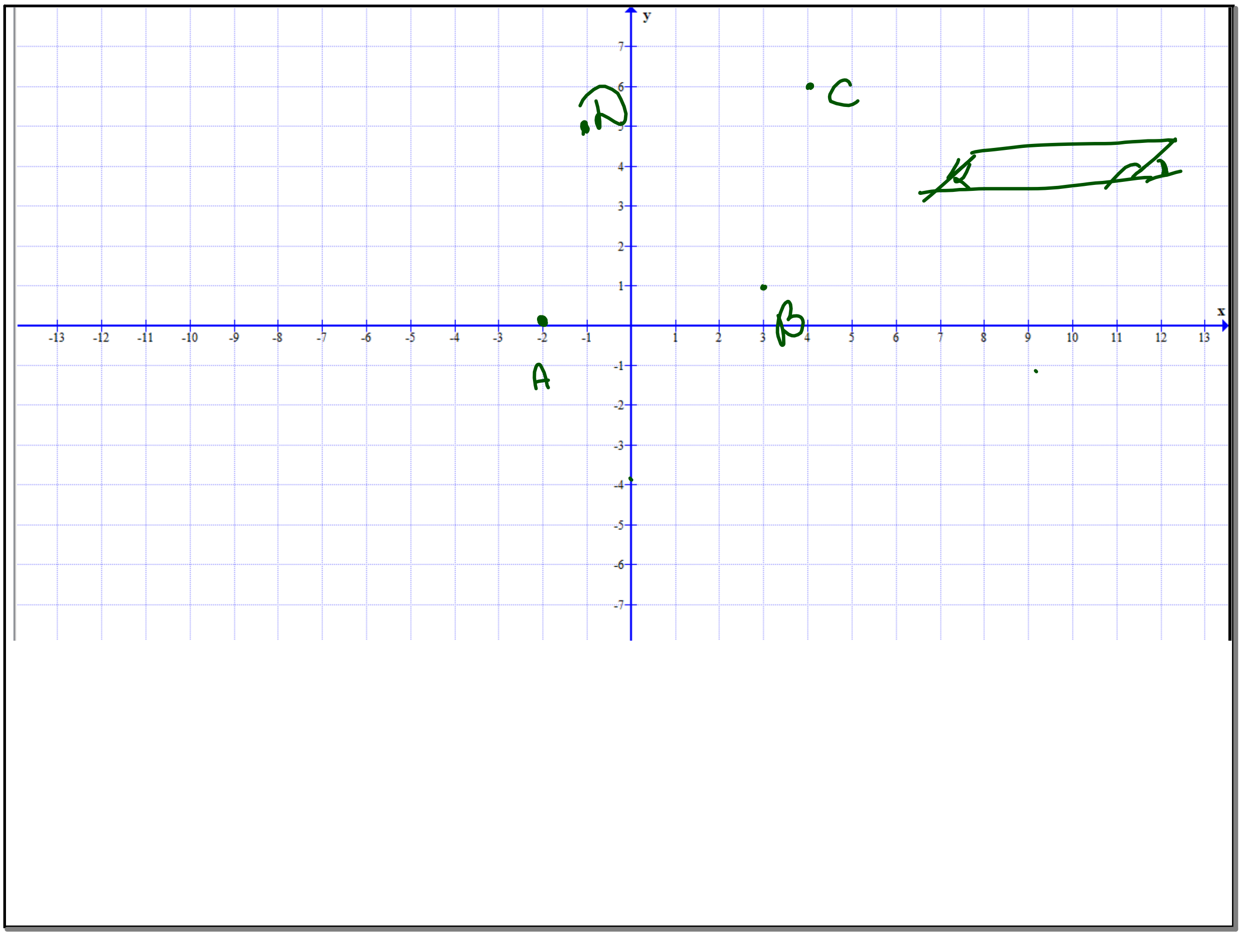
$$\boxed{P = \frac{1}{2} b c \cdot \sin\alpha}$$

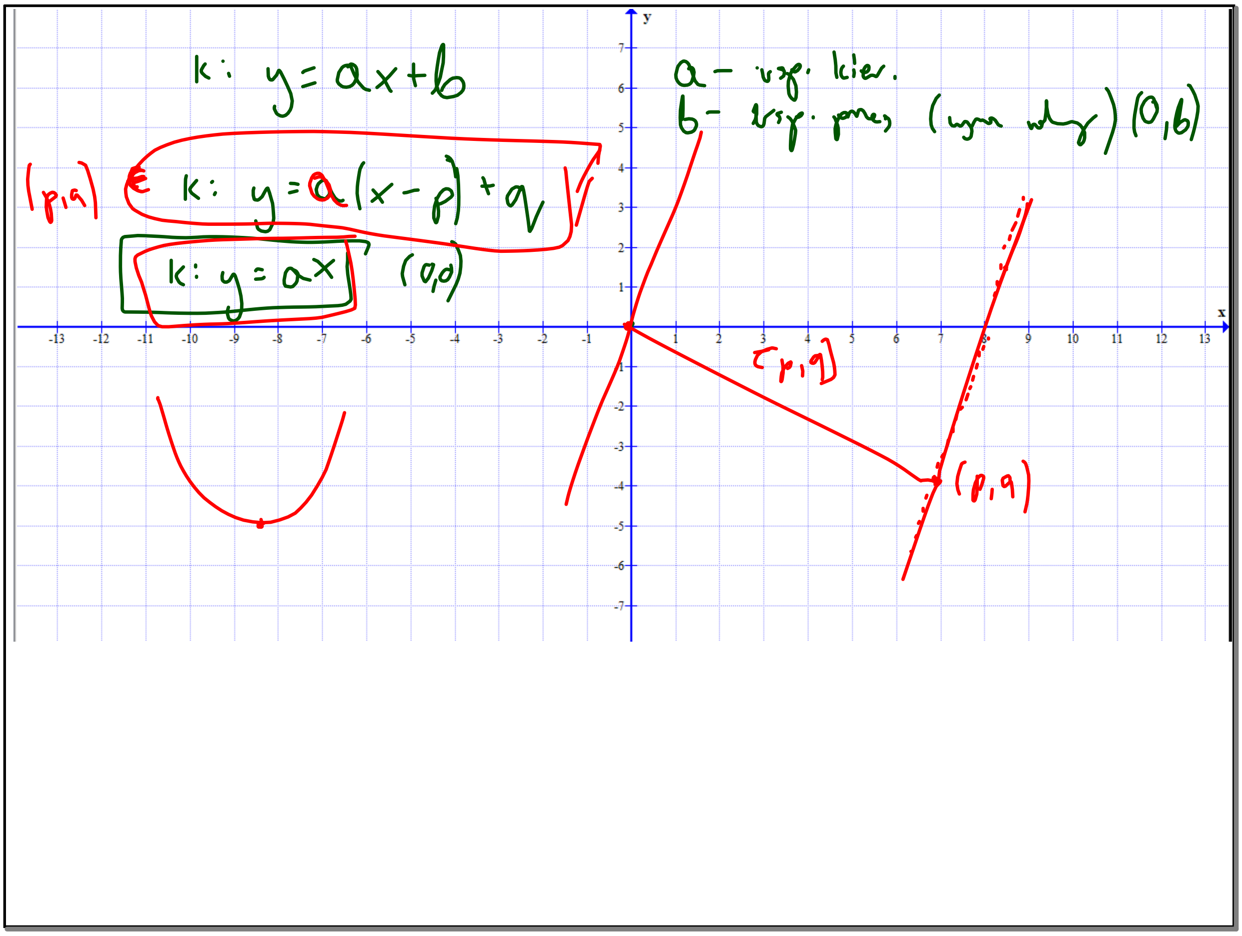
$\vec{a} = [x_a, y_a]$

$\vec{b} = [x_b ; y_b]$

$\vec{a} \parallel \vec{b} \iff \exists k \in \mathbb{R}\setminus\{0\} : \underbrace{\vec{b} = k \cdot \vec{a}}_{\text{Tw. o w. } \parallel} \iff \underbrace{\boxed{x_a \cdot y_b - y_a x_b = 0}}_{\text{SPRAW}}$

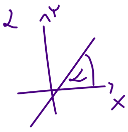



A
B
C
D


k: y = ax + b
a – wsp. kier.
b – wsp. przes. (wyraz wolny) (0,b)
(p,q) ∈ k: y = a(x − p) + q
k: y = ax
(0,0)
(p,q)
(p,q)

$k:\ y = a_k x + b_k$ $\qquad a = \operatorname{tg}\alpha$

$l:\ y = a_l x + b_l$



$k \parallel l \Leftrightarrow a_k = a_l$

$k \perp l \Leftrightarrow a_k \cdot a_l = -1 \Leftrightarrow a_l = -\frac{1}{a_k} \Leftrightarrow a_k = -\frac{1}{a_l}$

$k \parallel \vec{w} = [1; a]$ $\qquad k \perp \vec{n} = [-a, 1] = -a\left[1; -\frac{1}{a}\right]$

$\operatorname{tg} 0 = 0$ $\qquad \operatorname{tg} 45^\circ = 1$ $\qquad \cancel{\operatorname{tg} 90^\circ} = X$

$\operatorname{tg} 30^\circ = \frac{\sqrt{3}}{3}$ $\qquad \operatorname{tg} 60^\circ = \sqrt{3}$ $\qquad \operatorname{tg} 120^\circ =$

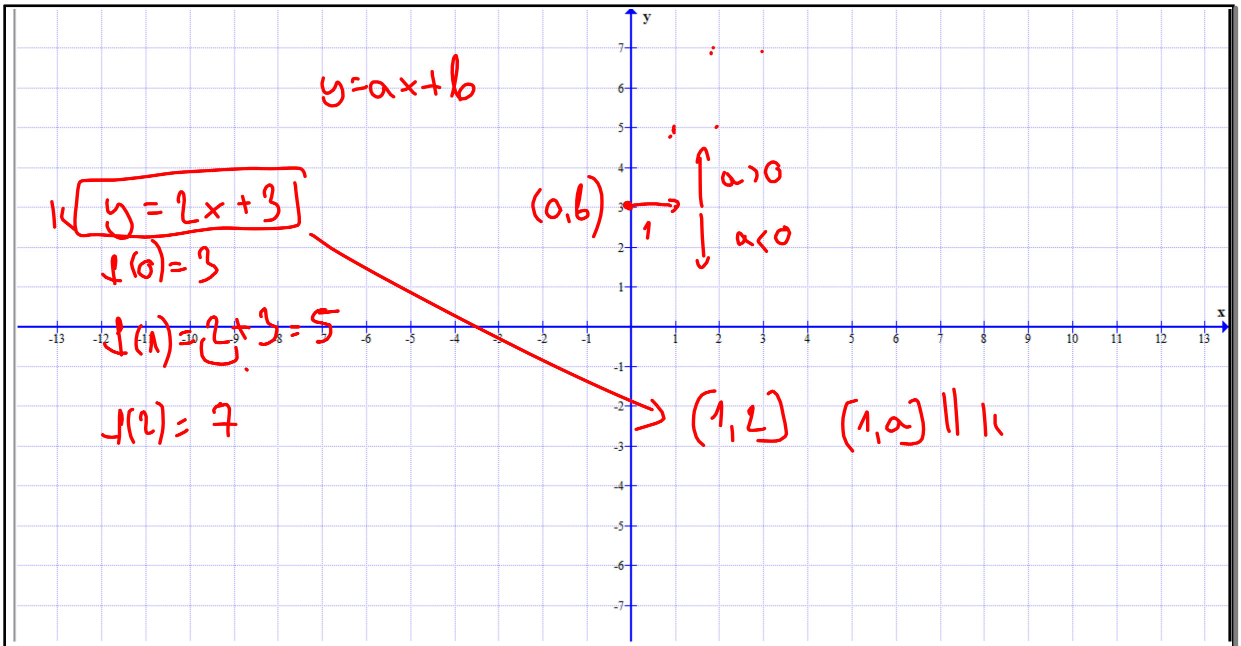
$\operatorname{tg} 135^\circ =$ $\qquad \operatorname{tg} 180^\circ$

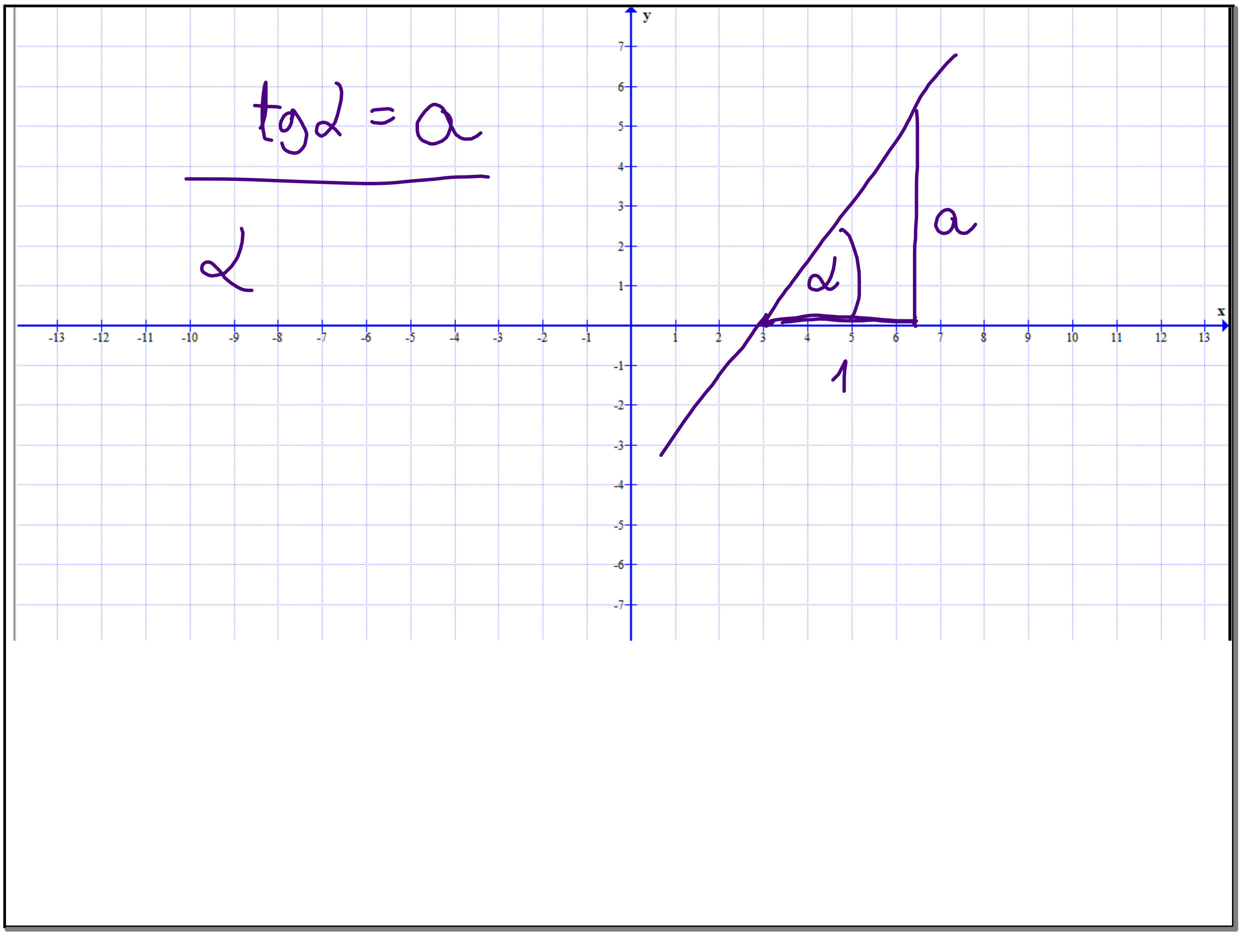
$\operatorname{tg} 150^\circ =$

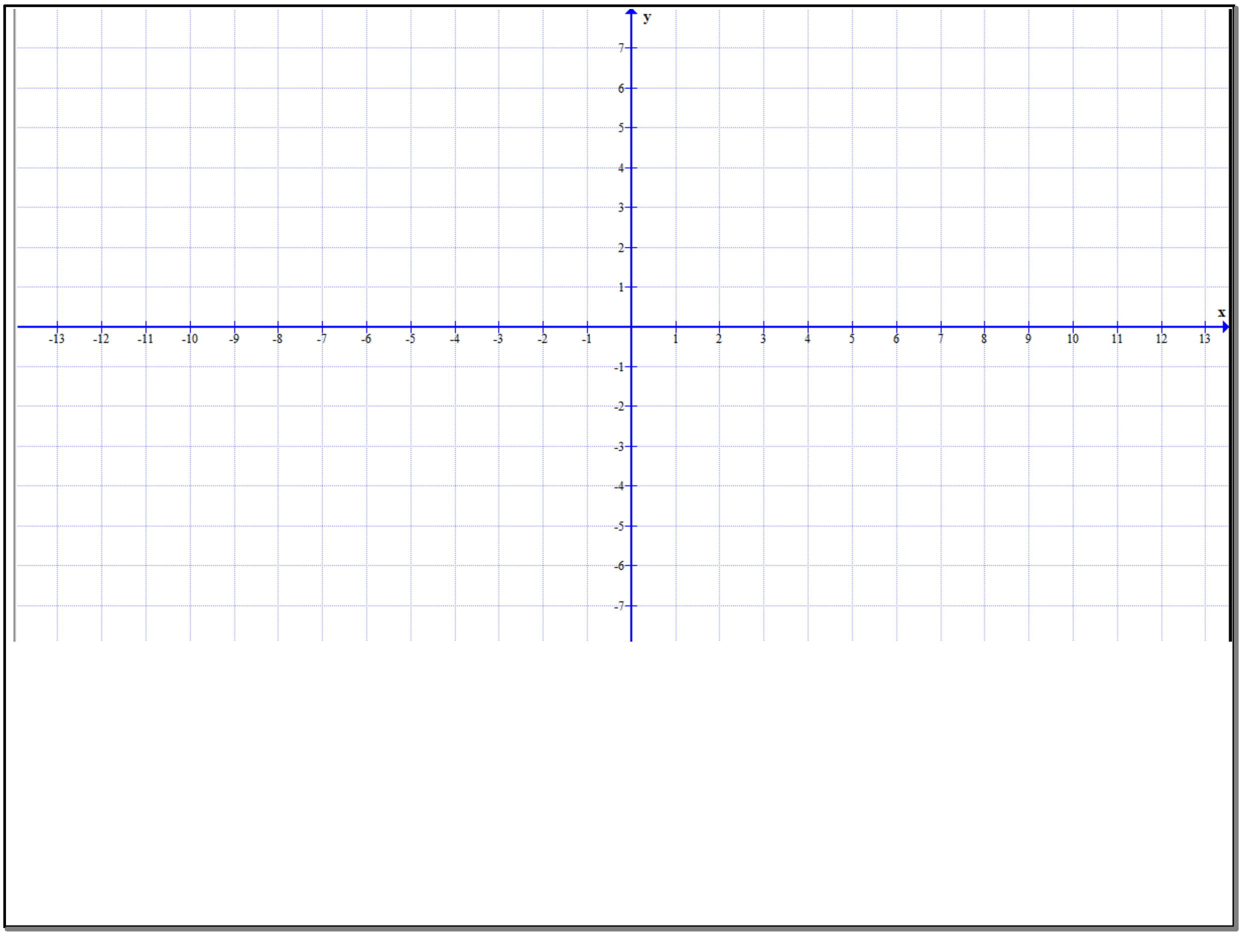
$\operatorname{tg}(120^\circ) = \operatorname{tg}(180 - 60^\circ) = -\operatorname{tg} 60^\circ = -\sqrt{3}$

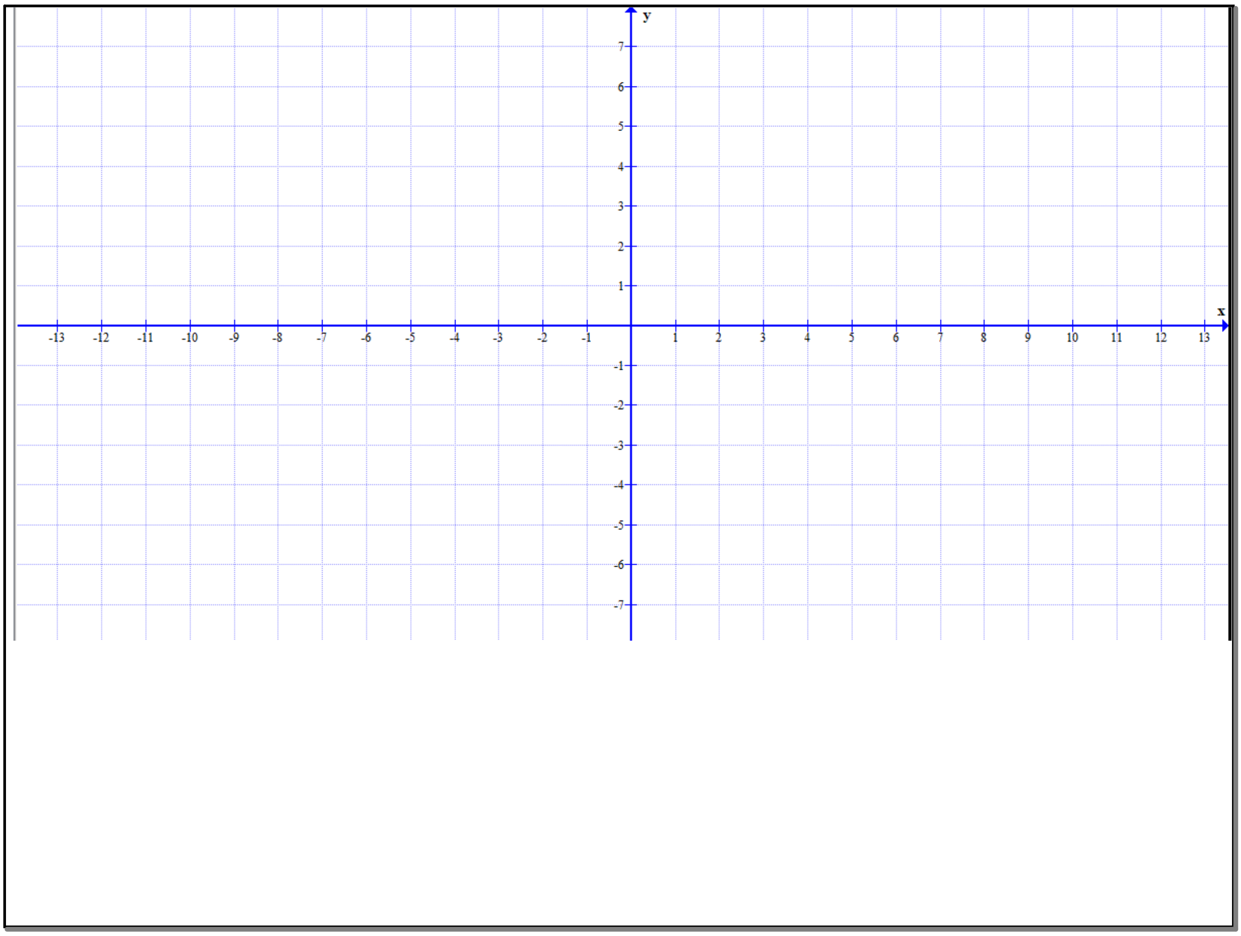
$\operatorname{tg}(180 - \alpha) = -\operatorname{tg}\alpha$

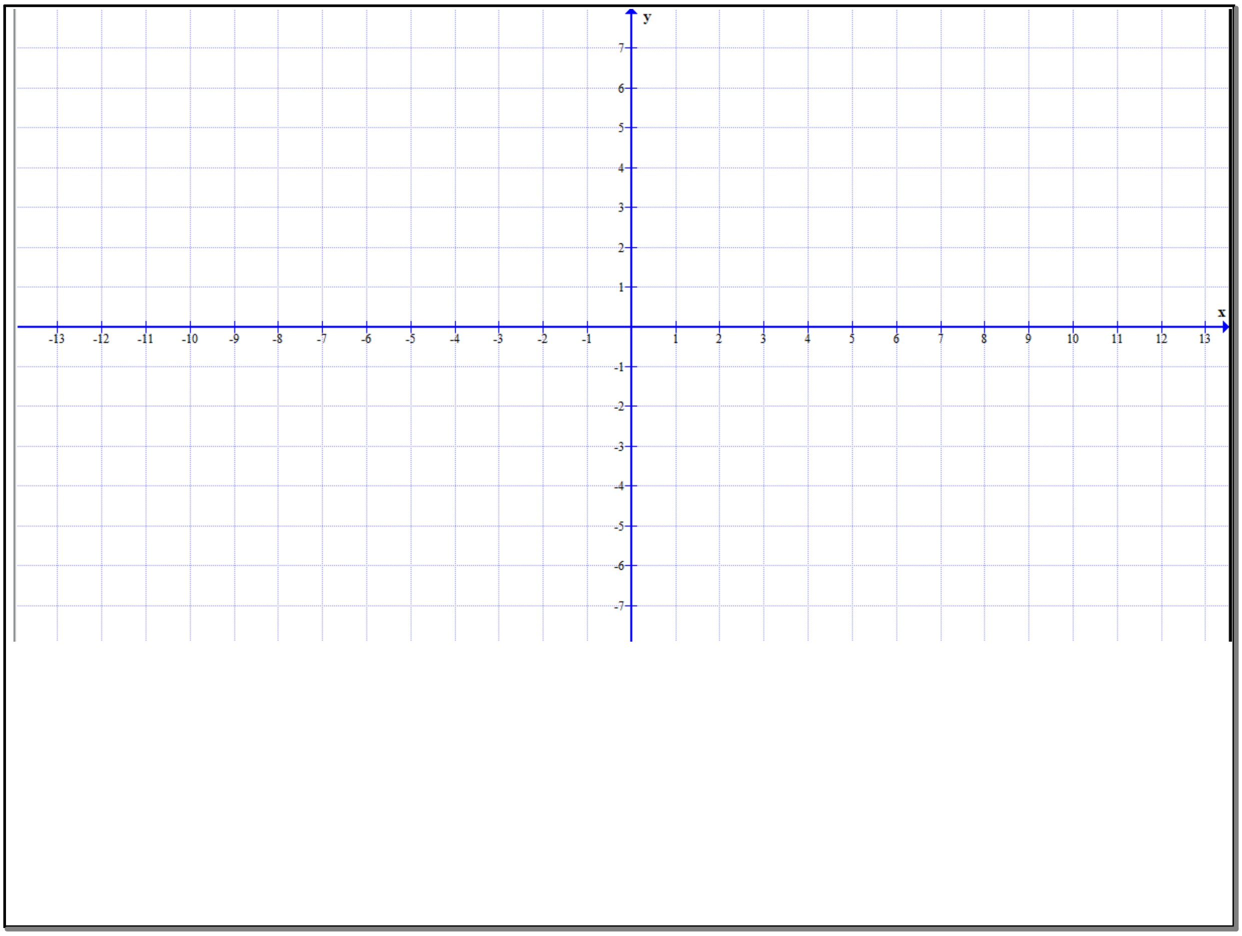
$\operatorname{tg}(90 + \alpha) = -\operatorname{ctg}\alpha$

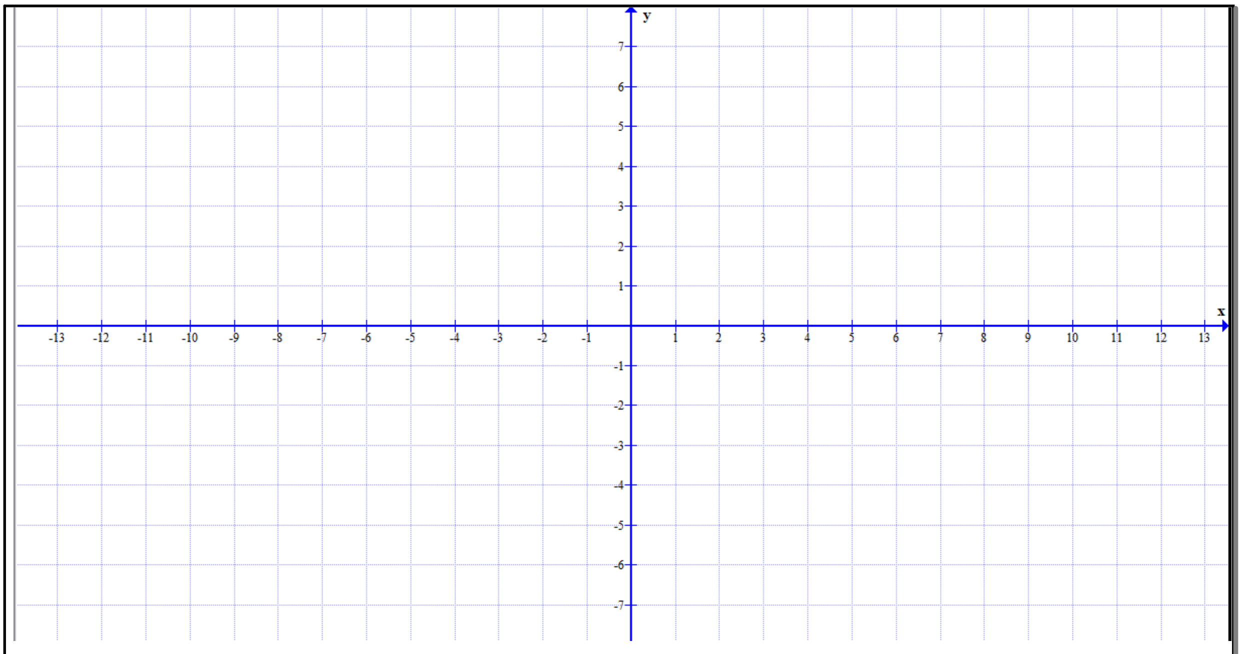



tgα = a
α
α
a
1




y
x
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13
7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7


y
x
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13
7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7


y
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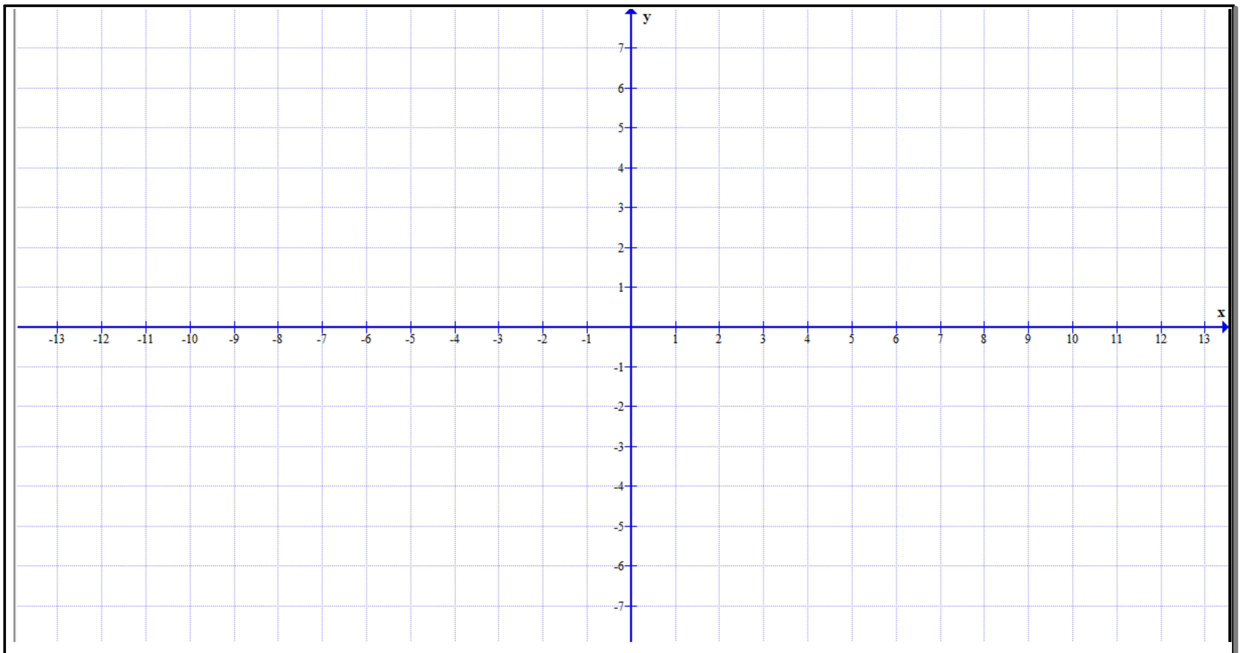
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13


y
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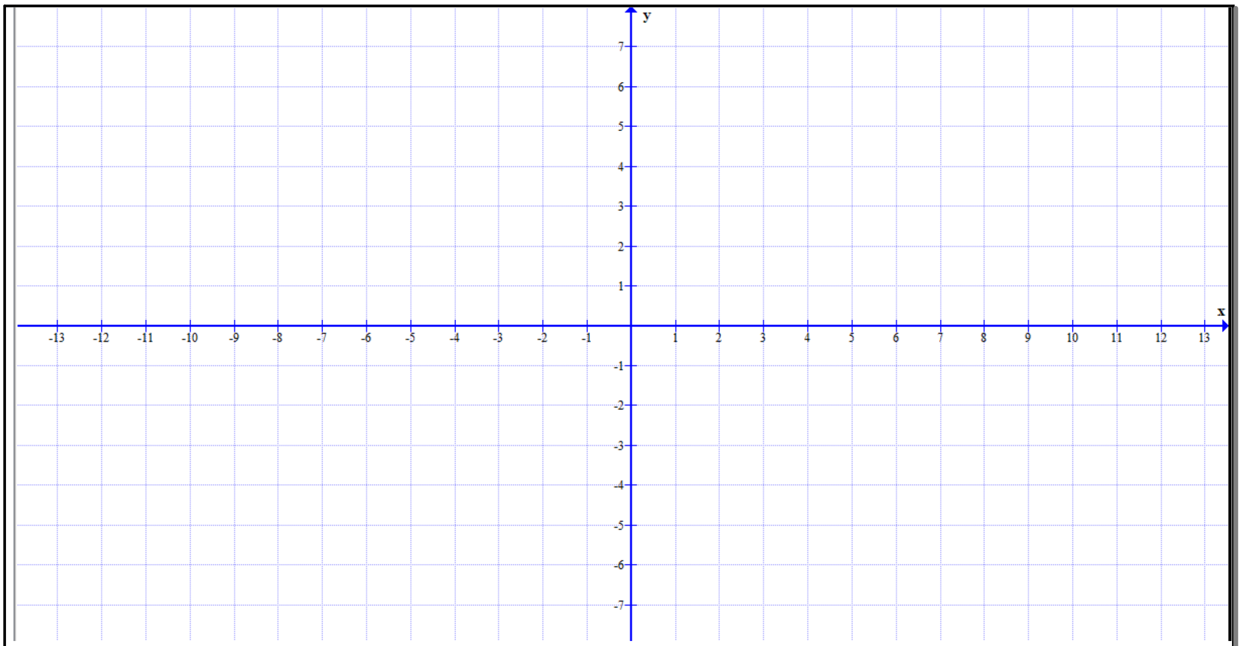
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13


y
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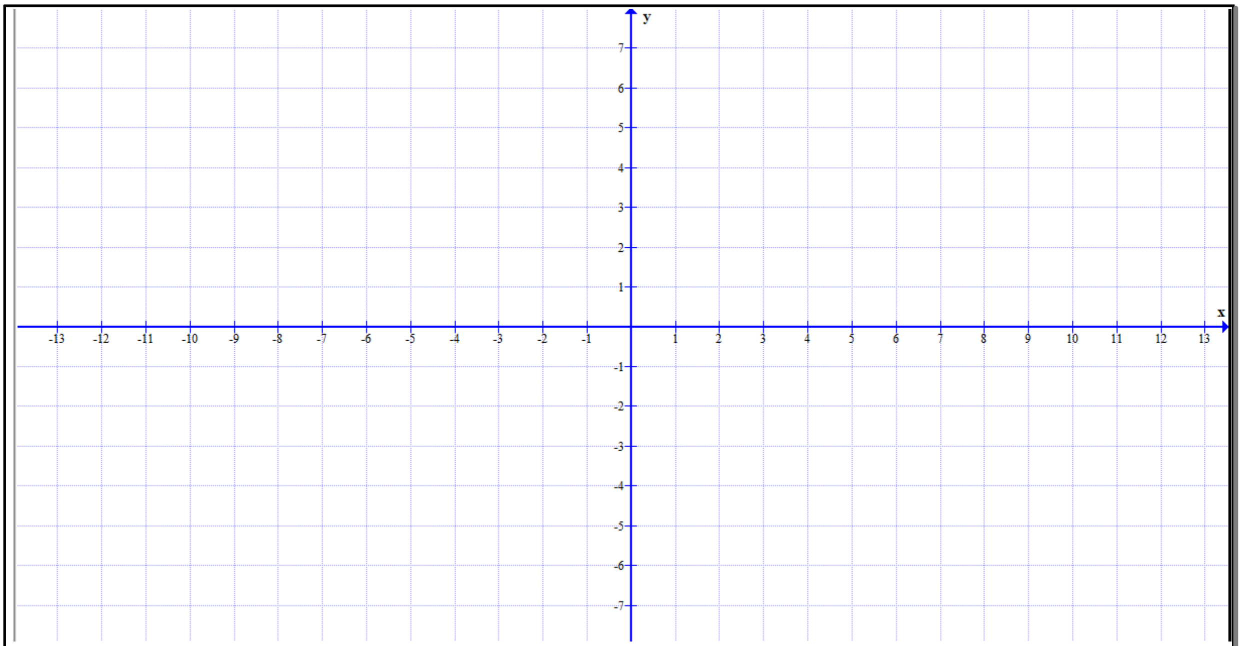
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13


y
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-2
-3
-4
-5
-6
-7
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13