

$$1. \quad 100^5 \cdot (0.1)^{-6} = (10^2)^5 \cdot (10^{-1})^{-6} = 10^{10} \cdot 10^6 = 10^{16}$$

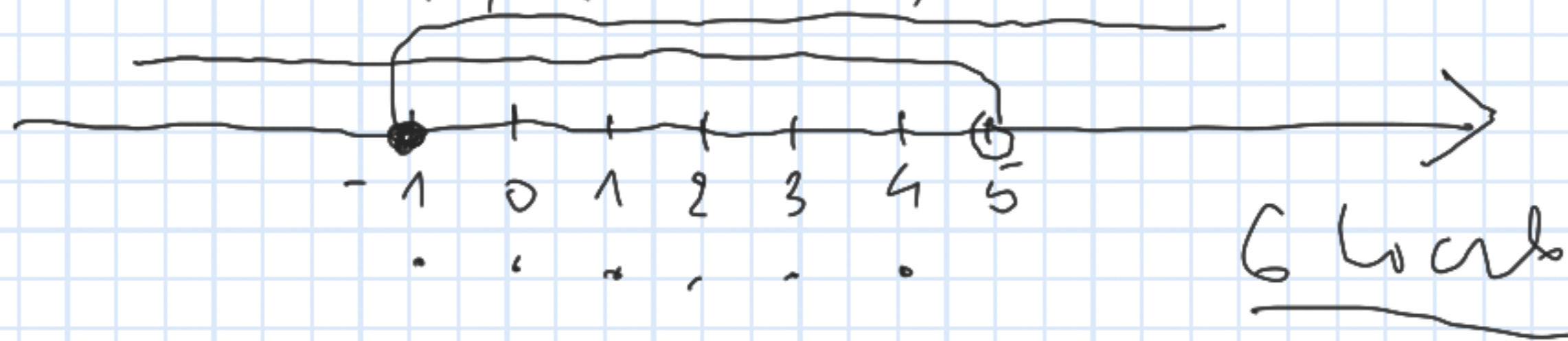
2. 78 standard 150% c.

$$1.5c = 78$$

$$\frac{3}{2}c = 78 \quad | \cdot \frac{2}{3}$$

$$c = \frac{78 \cdot 2}{3} = 52$$

$$3. (-\infty, 5), < -1, +\infty)$$



$$4. \quad 2 \log \sqrt{10} + \log 10^3 = \log (\sqrt{10})^2 + 3 \log 10 =$$

$$= \log 10 + 3 \log 10 = 1 + 3 = 4$$

$$\log_b c = \log_b c^a$$

$$\log_b b = 1$$

$$5. \quad 0.(3) - \frac{2^3}{3^3} = 0.333\ldots - \frac{2^3}{3^3}$$

$$\frac{1}{3} - \frac{2^3}{3^3} = \frac{11}{3^3} - \frac{2^3}{3^3} = -\frac{12}{3^3} = -\frac{4}{11}$$

$$x = 0.333\ldots$$

$$10x = 3.333\ldots$$

$$9x = 3 \quad | :9$$

$$x = \frac{3}{9} = \frac{1}{3}$$

$$6. \quad \frac{2-x}{2} - 2x \geq 1 \quad | \cdot 2$$

$$2-x-4x \geq 2$$

$$-5x \geq 0 \quad | : (-5)$$

$$x \leq 0$$

$$x \in (-\infty, 0]$$

$$\begin{aligned}
 7. \quad f(2) &= 0 & g(x) &= f(x) - 2 \\
 g(2) &= f(2) - 2 = 0 - 2 = -2 \\
 f(2) + g(2) &= 0 + (-2) = -2
 \end{aligned}$$

$$8. \quad \begin{cases} y = x + 1 \\ y = -2x + 4 \end{cases} \quad \begin{cases} x = 1 \\ y = 2 \end{cases}$$

$$\begin{aligned}
 x + 1 &= -2x + 4 \\
 3x &= 3 \quad | :3 \\
 x &= 1
 \end{aligned}$$

$$g. \quad y = 3x - 5$$

$$y = \frac{m-3}{2}x + \frac{9}{2}$$

$$\frac{m-3}{2} = 3 \quad | \cdot 2$$

$$m-3 = 6$$

$$m = 9$$

$$\frac{m-3}{2} \cdot 3 = -1 \quad | \cdot 2$$

$$(m-3) \cdot 3 = -2 \quad | : 3$$

$$m-3 = -\frac{2}{3}$$

$$m = -\frac{2}{3} + 3 = 2\frac{1}{3} = \frac{7}{3}$$

$$\frac{\frac{7}{3} - \frac{9}{3}}{2} = \frac{-\frac{2}{3}}{2} = -\frac{1}{3}$$

$$\begin{aligned}
 10. \quad f(x) &= \frac{x^2}{2x-2}, \quad x = \sqrt{3} - 1 & \left\{ \begin{array}{l} (a-b)^2 = \\ a^2 - 2ab + b^2 \end{array} \right. \\
 f(\sqrt{3}-1) &= \frac{(\sqrt{3}-1)^2}{2(\sqrt{3}-1)-2} = \frac{(\sqrt{3})^2 - 2\sqrt{3} \cdot 1 + 1^2}{2\sqrt{3} - 2 - 2} = \\
 &= \frac{3 - 2\sqrt{3} + 1}{2\sqrt{3} - 4} = \frac{4 - 2\sqrt{3}}{-4 + 2\sqrt{3}} = \frac{2(2 - \sqrt{3})}{-2(2 - \sqrt{3})} = -1
 \end{aligned}$$

11. $f(x) = 3^x - 2$ $(-1, -5)$, $(0, -2)$, $\underline{\underline{(0, -1)}}$

$$-5 = 3^{-1} - 2$$

$$-5 = \frac{1}{3} - 2$$

$$-2 = 3^0 - 2$$

$$-2 = 1 - 2$$

$$-1 = 3^0 - 2$$

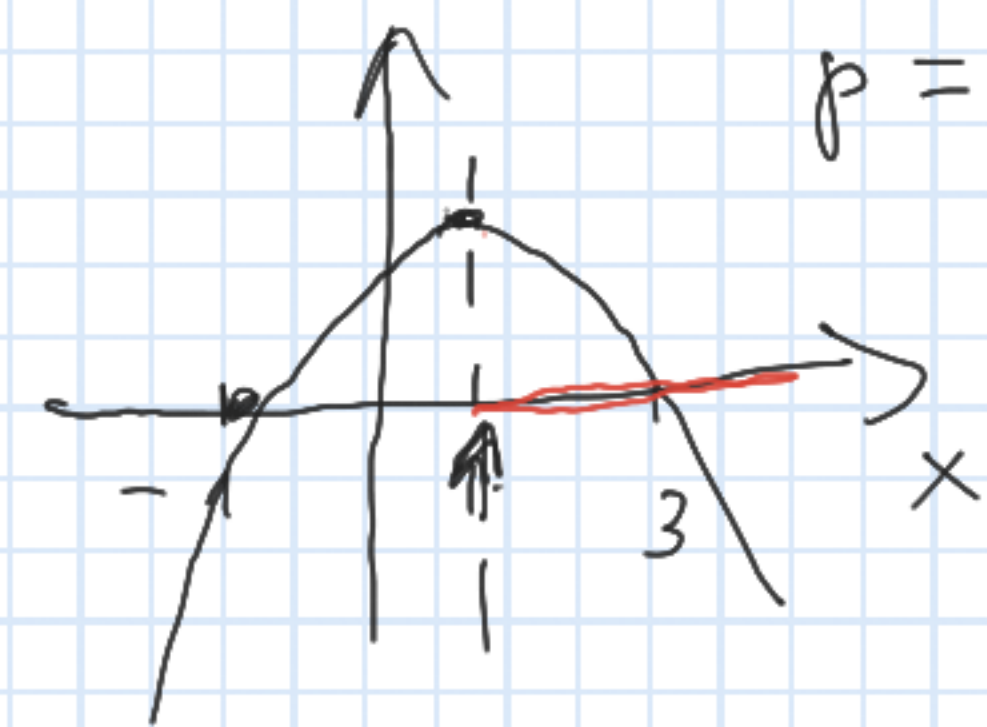
$$-1 = 1 - 2$$

$$-1 = -1$$

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

$f(x) = -2x^2 \dots$

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



also $x > 1$, $f \searrow$

13. 15, 3x, $\frac{5}{3}$, c. geom., wszystkie wyrazy dodatnie

$$\frac{3x}{15} = \frac{\frac{5}{3}}{3x}$$

$$x = \frac{5}{3}$$

$$9x^2 = 15 \quad \text{wz}$$

$$9x^2 = \frac{15}{3}$$

$$9x^2 = 25$$

$$x^2 = \frac{25}{9}$$

$$x = \frac{5}{3} \vee x = \cancel{\frac{5}{3}}$$

$$14. \text{ } f(n) = 3n^2 - 25n, \quad n \geq 1$$

$$3n^2 - 25n \leq 0$$

$$n = 1, 2, 3, \dots, 8$$

$$n(3n - 25) \leq 0$$

$$3n - 25 \leq 0$$

$$3n \leq 25 \quad | :3$$

$$n \leq \frac{25}{3} = 8 \frac{1}{3}$$

$$n \in \mathbb{N}; \quad n \geq 1; \quad n \leq 8 \frac{1}{3}$$

$$15. a_3 + a_5 = 58$$

$$a_3 = a_4 - r$$

$$a_5 = a_4 + r$$

$$a_4 - r + a_4 + r = 58$$

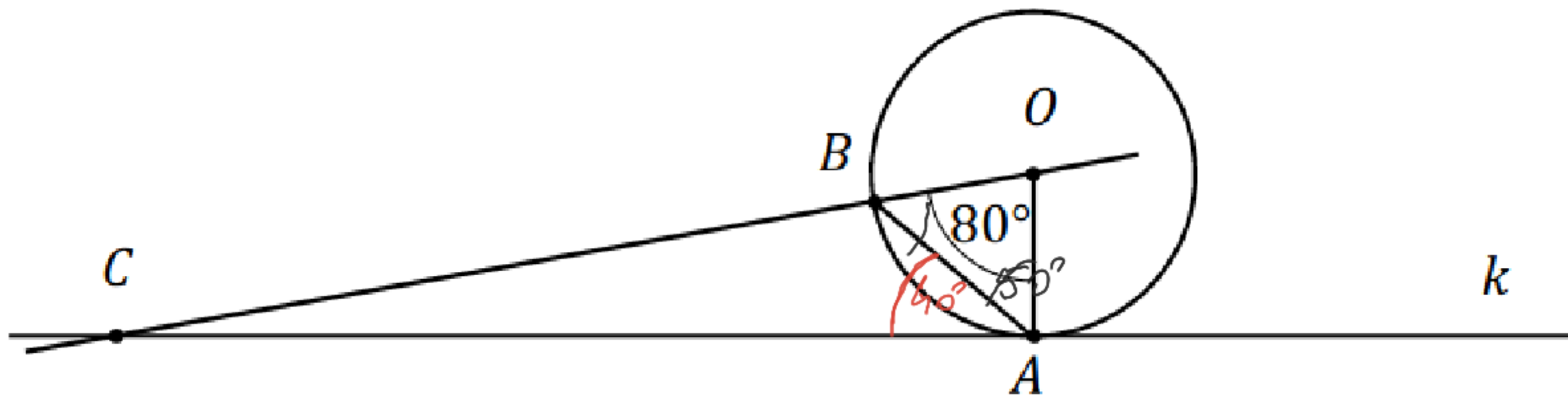
$$2a_4 = 58 \quad | :2$$

$$a_4 = 29$$

$$16. \frac{\cos \alpha}{1 - \sin^2 \alpha} \cdot \frac{1 - \cos^2 \alpha}{\sin \alpha} = \frac{\cos \alpha}{\cancel{\sin^2 \alpha} + \cos^2 \alpha - \cancel{\sin^2 \alpha}} \cdot \frac{\cancel{\cos^2 \alpha}}{\cancel{\cos^2 \alpha}} \cdot \frac{\cancel{\sin^2 \alpha}}{\cancel{\sin^2 \alpha}} =$$

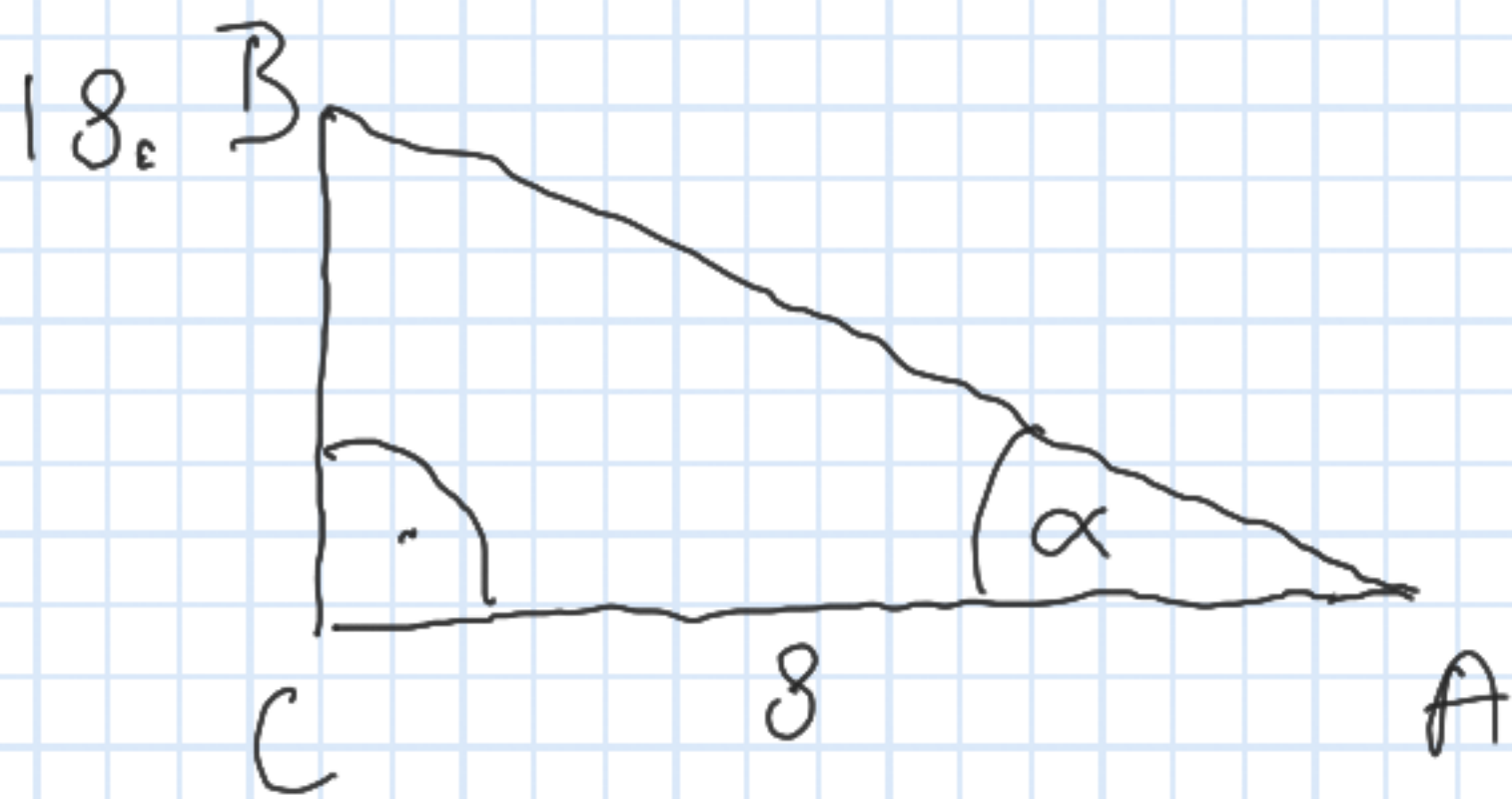
$$= \frac{\sin \alpha}{\cos \alpha} = \tan \alpha$$

17



$$\angle BAC = 40^\circ$$

$\triangle AOB$ — рівнобедренный 40°



$$P_{\Delta} = \frac{1}{2} \cdot 8 \cdot |BC|$$

$$\tan \alpha = \frac{2}{5}$$

$$\frac{|BC|}{8} = \frac{2}{5}$$

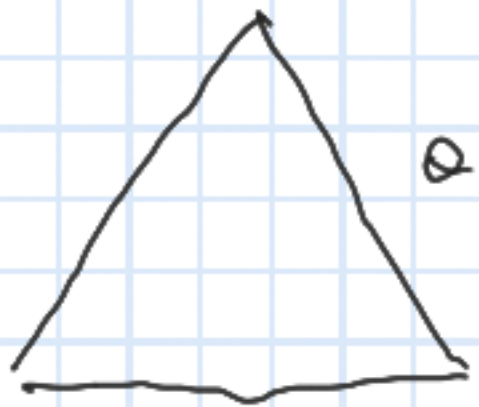
$$5|BC| = 16$$

$$|BC| = \frac{16}{5}$$

$$P_{\Delta} = \frac{1}{2} \cdot 8 \cdot \frac{16}{5} =$$

$$= 6\frac{4}{5}$$

19. $P_{\Delta} = \frac{4\sqrt{3}}{9}$



$$\frac{\sqrt{3}}{4} a^2 = \frac{4\sqrt{3}}{9} \quad | \cdot \frac{4}{\sqrt{3}}$$

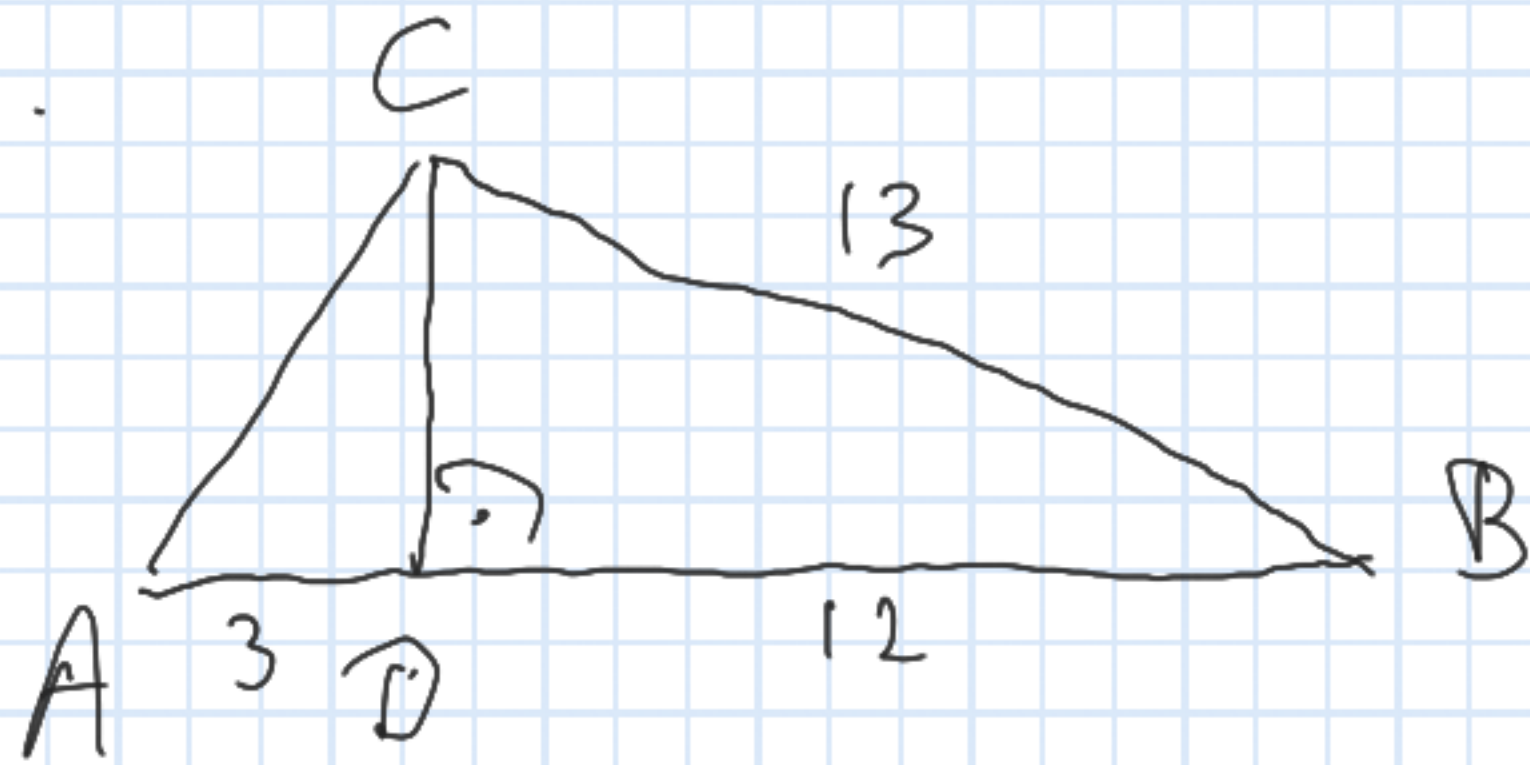
$$a^2 = \frac{16}{9}$$

$$Ob_{\Delta} = 3 \cdot \frac{4}{3} = 4$$

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

$$a = \frac{4}{3}$$

20.



$$|CD|^2 + 12^2 = 13^2$$

$$|CD|^2 = 169 - 144$$

$$|CD|^2 = 25$$

$$|CD| = 5$$

$$|AC| = ?$$

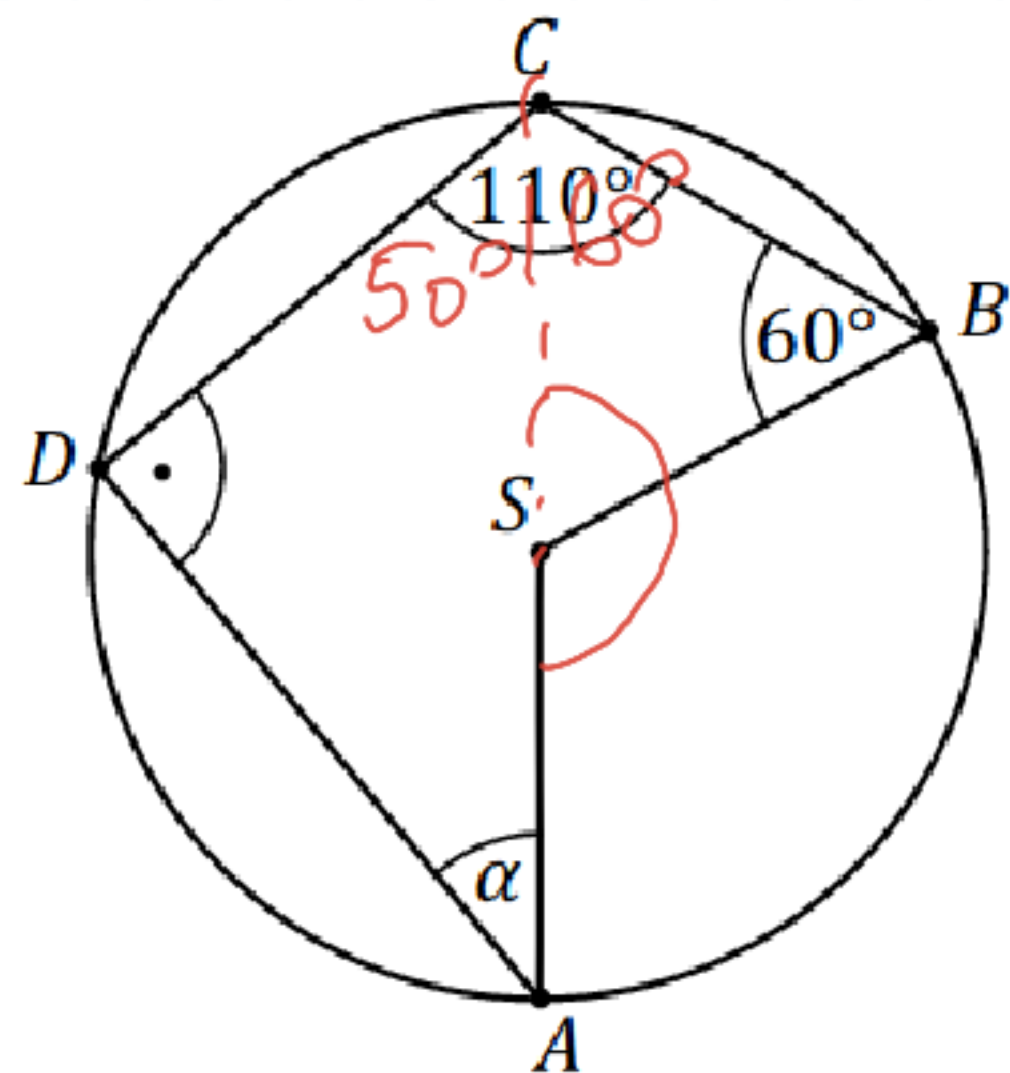
$$|AC|^2 = 5^2 + 3^2$$

$$|AC|^2 = 25 + 9$$

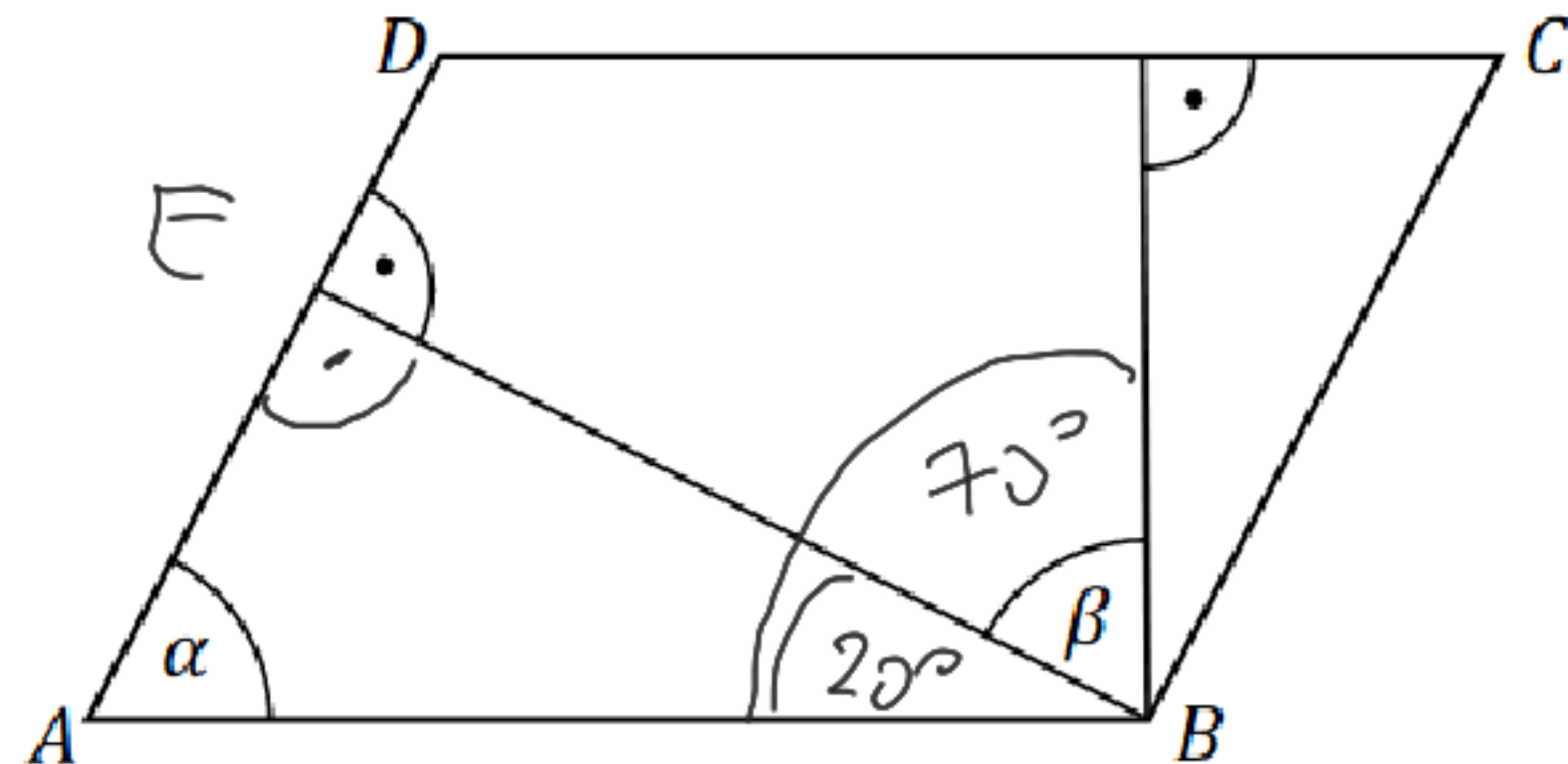
$$|AC|^2 = 34$$

$$|AC| = \sqrt{34}$$

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22.



$$\alpha = 40^\circ$$

$$\alpha = 180^\circ - 90^\circ - 50^\circ = 40^\circ$$

$$\alpha = 70^\circ$$

$$\beta = 70^\circ$$

$$23. \quad n \geq 2$$
$$\frac{n(n-3)}{2} = n + 25 \quad | \cdot 2$$

$$n^2 - 3n = 2n + 50$$

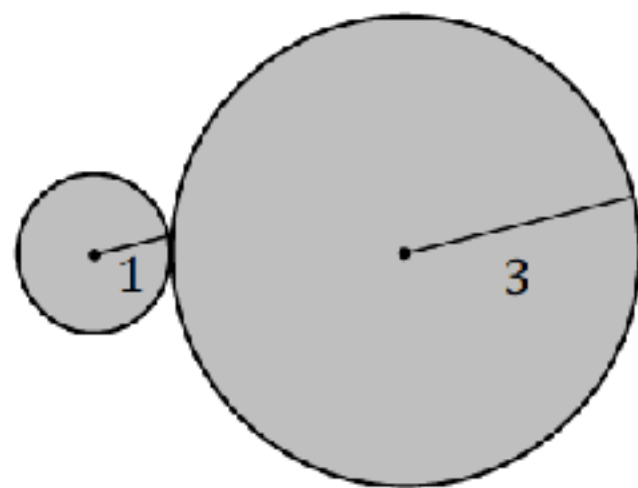
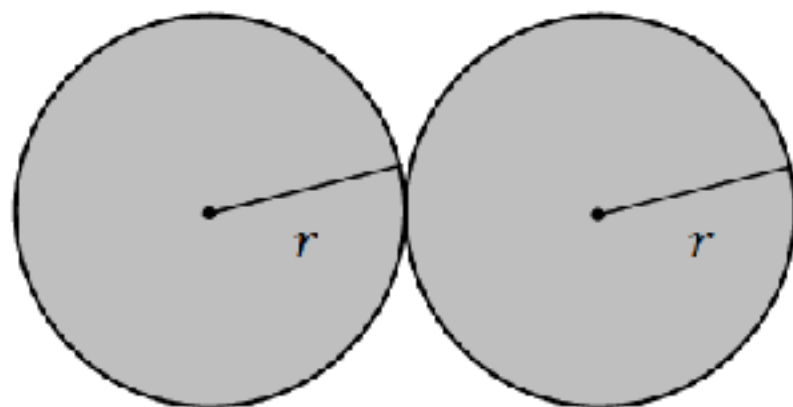
$$n^2 - 5n - 50 = 0$$

$$\Delta = 25 + 200 = 225$$

$$n_1 = \frac{5 - 15}{2} < 0$$

$$n_2 = \frac{5 + 15}{2} = 10$$

24.

Figura F_1 Figura F_2 

$$P_o = \pi r^2$$

$$P_{F_1} = \pi \cdot 1^2 + \pi \cdot 3^2 = \pi + 9\pi = 10\pi$$

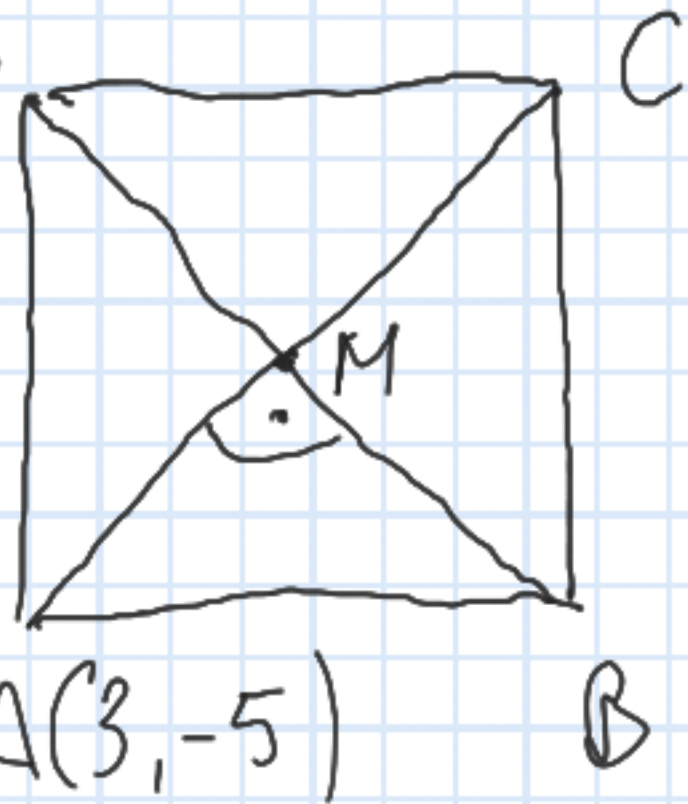
$$P_{F_2} = 2\pi r^2$$

$$2\pi r^2 = 10\pi \quad / : 2\pi$$

$$r^2 = 5$$

$$r = \sqrt{5}$$

25. D



M(1,3)

 $P_{\square} = ?$

$$|AM| = \sqrt{(1-3)^2 + (3+5)^2} = \sqrt{4 + 64} = \sqrt{68} = \sqrt{4 \cdot 17} \\ = 2\sqrt{17}$$

$$|AC| = 4\sqrt{17} \\ d = 4\sqrt{17}$$

$$\underline{d = 2\sqrt{17}}$$

$$2\sqrt{17} = 4\sqrt{17}$$

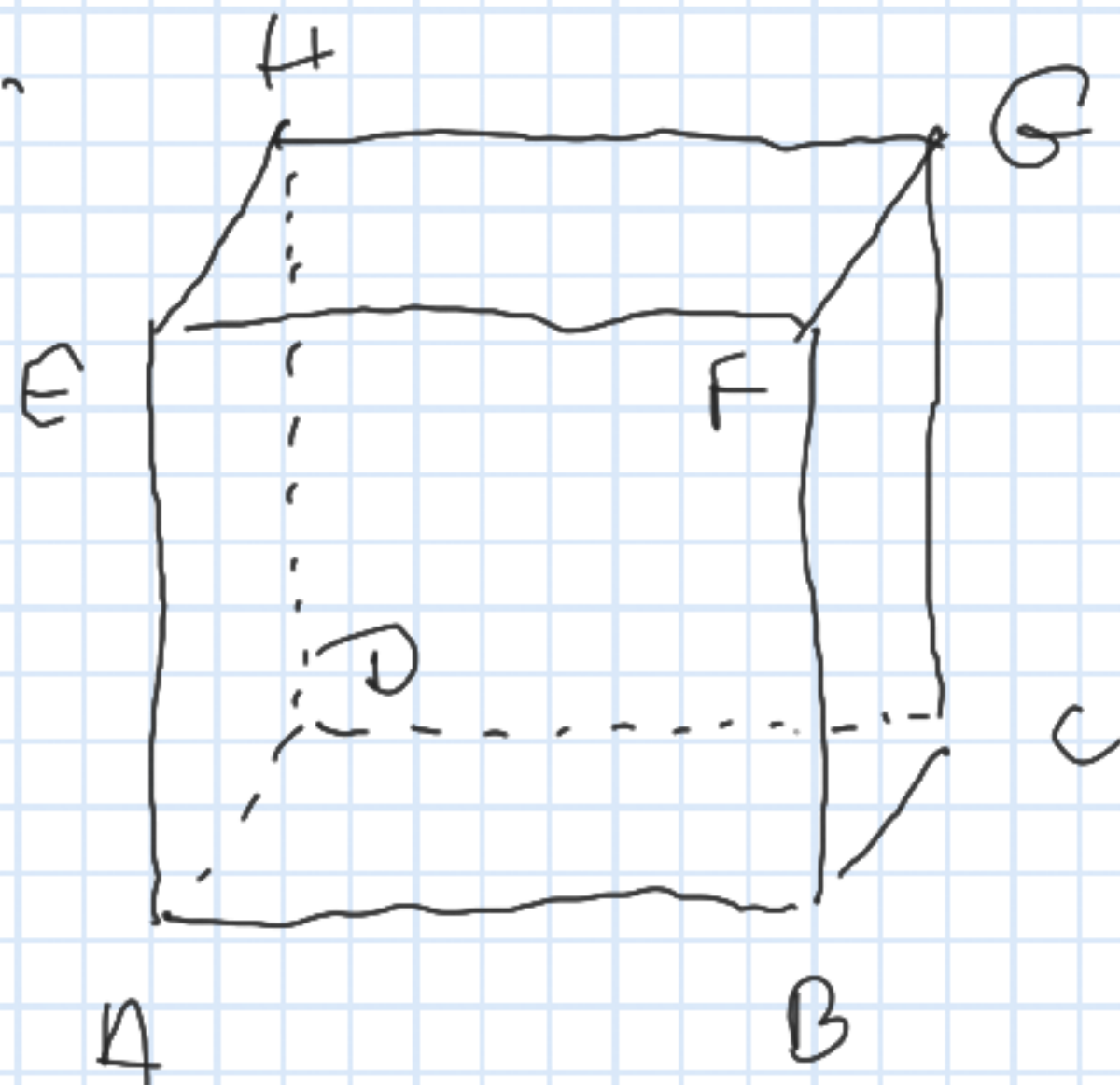
$$2e^2 = 16 \cdot 17 \quad | : 2$$

$$e^2 = 8 \cdot 17 = 136$$

$$P_{\square} = e^2$$

$$P = 136$$

26.



$$\binom{8}{2} = \frac{8 \cancel{7} \cdot 8 \cancel{6} \cdot 1}{2 \cdot 1} = 28$$

$$\frac{4}{28} = \frac{1}{7}$$

$$8 \cdot 7 = 56$$

$$\frac{56}{2} = 28$$

$$HB, AG, CE, DF$$

$$\frac{4}{28} = \frac{1}{7}$$

$$22. \quad \{1, 2, 3, 7, 8, 9\}$$

$$7 \quad \underline{\underline{1}} \quad \underline{\underline{1}}_1$$

$$5 \cdot 4 = 20$$

$$8 \quad \underline{\underline{1}} \quad \underline{\underline{1}}_1$$

$$5 \cdot 4 = 20$$

$$9 \quad \underline{\underline{1}} \quad \underline{\underline{1}}_1$$

$$5 \cdot 4 = 20$$

$$28. \quad \{1, 2, \underbrace{2x}, \underbrace{x+2}, 5, 6\}, \quad Me = 4$$

$$L_1 = \frac{2x + x + 2}{2} \quad | : 2$$

$$8 = 3x + 2$$

$$6 = 3x$$

$$x = 2$$