MATEMATIKA

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Šk. GOD. 2025./2026.

I. DIO

1.

A.) $5-7=-2 \notin \mathbb{N}$

B.) $\frac{5}{7} \notin \mathbb{Z}$

C.)

$\Rightarrow$ **C**

D.) $\sqrt{2}\cdot\sqrt{8}=\sqrt{16}=4 \notin \mathbb{N}$.

2. $z=\frac{a+2i}{1+i}=\frac{a+2i}{1+i}\cdot\frac{1-i}{1-i}=\frac{a+2i-ai-2i^2}{1+1}=$

$=\frac{a+2}{2}+\frac{2-a}{2}\cdot i$

D

$\operatorname{Im} z=0 \Rightarrow \boxed{a=2}$

3. $\frac{x^2-2x+1}{2x^3-2x}=\frac{(x-1)^2}{2x(x^2-1)}=\frac{(x-1)^2}{2x(x-1)(x+1)}=\frac{x-1}{2x(x+1)}$ **C**

4. $\frac{1.90+x.0}{1+x}=50$

$90=50(1+x)$

$90=50+50x$

$50x=40 \Rightarrow \boxed{x=\frac{4}{5}=0.8}$

D

5. $3x^2+2ax-5a=0$

$x_1x_2=20$

$-\frac{5a}{3}=20$

$-5a=60 \;/:(-5)$

$\boxed{a=-12}$

B

6. $\log_5 12.5=n-\log_5 10$

$n=\log_5 12.5+\log_5 10=\log_5 125=\log_5 5^3=3$

$5^{2-n}=5^{2-3}=5^{-1}=\boxed{\frac{1}{5}}$

B

7. Sa slike se očitava

$\boxed{a=-\frac{1}{2}, b=-1}$

A

8. $f(x) = 0.5(x+1)^2 - 2$

$\Rightarrow a > 0$, $T(-1, -2)$ $\Rightarrow$ **A**

9. $f(x) = 5^x - 1$

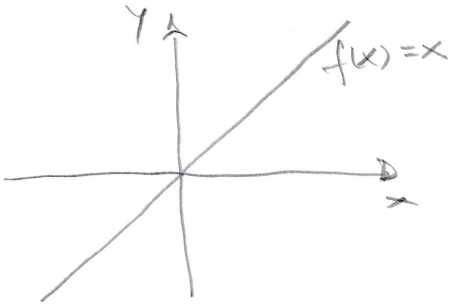
$x = 5^y - 1$

$5^y = x + 1$

$y = f^{-1}(x) = \log_5(x+1)$

$D_{f^{-1}} = \langle -1, +\infty \rangle$, $-1 \notin D_{f^{-1}}$ **A**

10.



B

11. $a_5 = 7$, $a_{11} = 115$, $a_8 = ?$

$a_8 = \frac{a_5 + a_{11}}{2} = \frac{7 + 115}{2} \Rightarrow \boxed{a_8 = 61}$ **B**

12. $S(t) = 1.15t^2 + t$

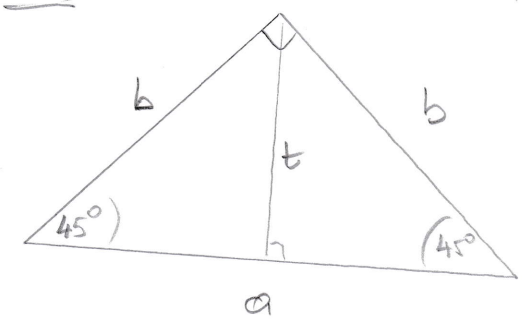
$v(t) = S'(t)$

$S'(t) = 2 \cdot 1.15t^2 + 1$

$v(t) = 2.3 \cdot t + 1$

$v(6) = 2.3 \cdot 6 + 1 \Rightarrow v(6) = 14.8$ **D**

13.



$t = 4\sqrt{2}$, $t = \frac{a}{2} \Rightarrow a = 8\sqrt{2}$, $b = t\sqrt{2} \Rightarrow b = 8$

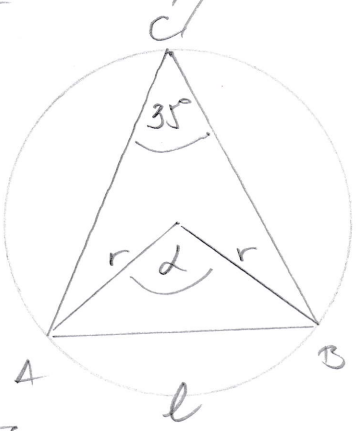
$P = \frac{1}{2}b^2 = \frac{1}{2} \cdot 8^2$

$\Rightarrow \boxed{P = 32}$ **C**

14. $k = 0{,}5$, $P_2 = k^2 \cdot P_1 = 0{,}5^2 \cdot P_1 = 0{,}25 P_1$

$\Rightarrow P_1 = 4 \cdot P_2$ **D**

15. $r = 9$, $\beta = 35°$

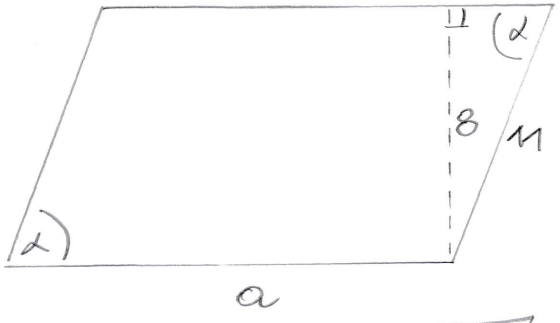


$\alpha = 2 \cdot 35° \Rightarrow \alpha = 70°$

$\ell = \frac{r\pi\alpha}{180°} = \frac{9 \cdot \pi \cdot 70°}{180°}$

$\Rightarrow \ell = 3{,}5\pi$ **D**

16.

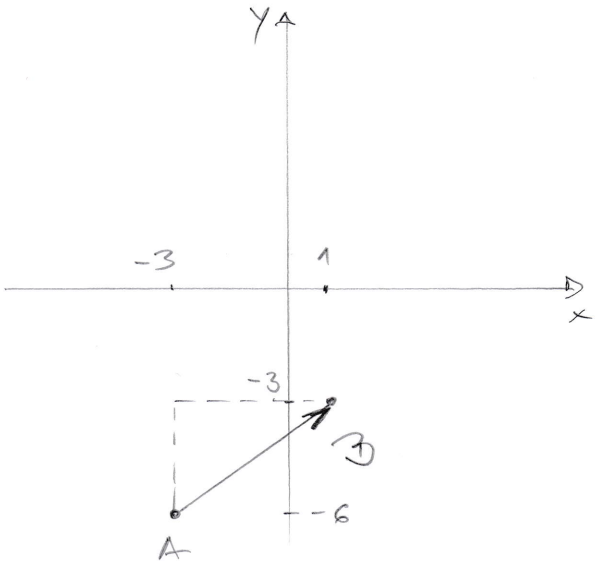


$\sin\alpha = \frac{8}{11}$

$\Rightarrow \alpha = 46°39'30''$ **C**

17. dužina $\overline{BP}$ **B**

18. $\vec{AB} = 4\vec{i} + 3\vec{j}$, $B(1,-3)$, $A(x,y)$



$\vec{AB} = (1-x)\vec{i} + (-3-y)\vec{j}$

$= 4\vec{i} + 3\vec{j}$

$\Rightarrow 1 - x = 4 \Rightarrow x = -3$

$-3 - y = 3 \Rightarrow y = -6$

$\Rightarrow A(-3,-6)$ **A**

19. $k_1 = 1$, $k_2 = -1$

$\Rightarrow \varphi = 30°$ **D**

20. $a<b<c<d<e$

$e-a=10 \Rightarrow e=a+10$

$c=15$

$e-c\geq 2 \Rightarrow e\geq 17 \Rightarrow a+10\geq 17 \Rightarrow a\geq 7$

C

21. $z=-5i$

$r=5,\ \varphi=\frac{3\pi}{2} \Rightarrow z=5\left(\cos\frac{3\pi}{2}+i\sin\frac{3\pi}{2}\right)$

22.

$$\frac{16^{3x+2}}{8^{4x+2}}=\frac{(2^4)^{3x+2}}{(2^3)^{4x+2}}=\frac{2^{12x+8}}{2^{12x+6}}=2^2=\boxed{4}$$

23. $\left(-\sqrt[3]{a^2}\right)^6=\left(-a^{\frac{2}{3}}\right)^6=\boxed{a^4}$

24. $N(t)=13\cdot 2^{t+k}$

$N(0)=13\cdot 2^k$

$N(5)=13\cdot 2^{5+k}=1664 \ /:13$

$2^{5+k}=128 \ /:2^5$

$2^k=4 \Rightarrow k=2$

$N(0)=13\cdot 2^2 \Rightarrow \boxed{N(0)=52}$

25. $a_n=60-4n,\ S_n=0$

$a_1=60-4\cdot 1=56$

$S_n=\frac{n}{2}[a_1+a_n]$

$\frac{n}{2}[56+60-4n]=0,\ n\neq 0$

$116-4n=0 \Rightarrow \boxed{n=29}$

26. $a_1=3q$

$a_2+a_3=a_1^2$

$a_1q+a_1q^2=a_1^2 \ /:a_1$

$q+q^2=a_1$

$q+q^2=3q$

$q^2-2q=0$

$q(q-2)=0 \Rightarrow \boxed{q=2}$

$(q\neq 0)$

27. npr. $a_n = \frac{1}{n}$, $a_n = \frac{1}{n^2}$ ničla.

28. $f(x) = \frac{\sin x}{x}$

$$f'(x) = \frac{\cos x \cdot x - \sin x \cdot 1}{x^2} = \boxed{\frac{x\cos x - \sin x}{x^2}}$$

29. Funkcija pada na intervalu na katerem je prva derivacija <0, dalje $\boxed{\langle -\infty, -2\rangle}$.

30. $P = 84$, $r = 3$

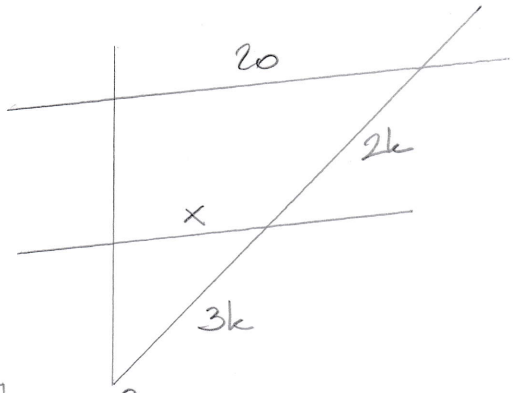
$P = r \cdot s$

$84 = 3 \cdot s \Rightarrow s = 28$

$o = 2s$

$\boxed{o = 56}$

31.

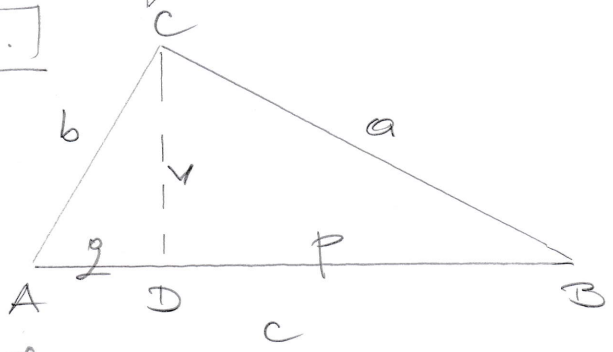


$x : 20 = (3k) : (5k) = 3 : 5$

$5x = 60$

$\boxed{x = 12}$

32.



$q = 5$

$p = 20$

$c = p + q \Rightarrow c = 25$

$b^2 = qc \Rightarrow b = \sqrt{5 \cdot 25}$

$\Rightarrow \boxed{b = 5\sqrt{5}}$

33. $r = 5$, $S(0, q)$, $T(3, 6)$

$(x-p)^2 + (y-q)^2 = r^2$

$x^2 + (y-q)^2 = 25$

$3^2 + (6-q)^2 = 25$

$(6-q)^2 = 16 \quad /\sqrt{\ }$

$6 - q = \pm 4$

$q = 6 \pm 4$

$q_1 = 10$

$q_2 = 2$

$\Rightarrow \boxed{x^2 + (y-10)^2 = 25 \text{ ali } x^2 + (y-2)^2 = 25}$

34. $\binom{12}{3} \cdot \binom{8}{2} = \frac{12!}{3!\,9!} \cdot \frac{8!}{2!\,6!} = \frac{12 \cdot 11 \cdot 10}{6} \cdot \frac{8 \cdot 7}{2} = \boxed{6160}$

35.1. 88 % od $x = 220$

$\frac{88}{100} \cdot x = 220 \Rightarrow \boxed{x = 250}$

35.2.

$12p + 3s = 306$

$p + s = 42$

$s = 42 - p$

$12p + 3(42 - p) = 306$

$12p + 126 - 3p = 306$

$9p = 180 \Rightarrow \boxed{p = 20}$

36.1. $f(x) = 2x^2 + 4x$

$f(1) = 2 \cdot 1^2 + 4 \cdot 1 = 6 \Rightarrow T(1,6)$

$f'(x) = 4x + 4$, $f'(1) = 8 = k$

$y - 6 = 8(x - 1)$

$y - 6 = 8x - 8 \Rightarrow \boxed{y = 8x - 2}$

36.2. $g(x) = f(x) + p$

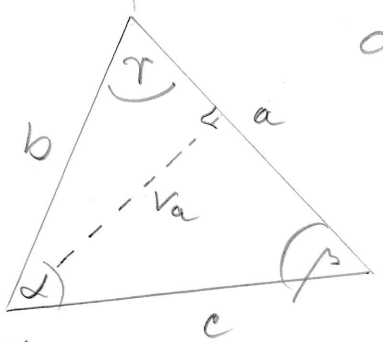
$g(x) = 2x^2 + 4x + p$, $D = 0$

$b^2 - 4ac = 0$

$4^2 - 4 \cdot 2 \cdot p = 0$

$16 - 8p = 0 \Rightarrow \boxed{p = 2}$

37.1.



$a = 13$, $b = 17$, $\gamma = 115°$

$\sin\gamma = \frac{v_a}{b} \Rightarrow v_a = 17 \sin 115°$

$\Rightarrow \boxed{v_a = 15.41}$

37.2. $c^2 = a^2 + b^2 - 2ab\cos\gamma$

$c = \sqrt{13^2 + 17^2 - 2 \cdot 13 \cdot 17 \cdot \cos 115°}$

$\Rightarrow \boxed{c = 25.39}$

38.1.

$$A^{12}+(2-A^3)(2+A^3)(4+A^6)=$$

$$=A^{12}+(4-A^6)(4+A^6)=A^{12}+16-A^{12}=\boxed{16}$$

38.2.

$$B^{12}-625<0$$

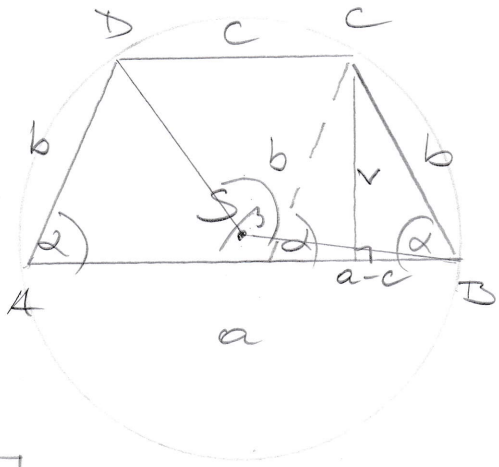
$$B^3=x$$

$$x^4-625<0$$

$$(x^2-25)(x^2+25)<0 \quad /:x^2+25$$

$$(x-5)(x+5)<0 \Rightarrow \boxed{x\in\langle -5,5\rangle}$$

39.1.



$a=8,\ b=6.32,\ \alpha=71°34'$

$$\cos\alpha=\frac{\frac{a-c}{2}}{b}$$

$$a-c=2b\cos\alpha$$

$$c=a-2b\cos\alpha$$

$$\boxed{c=4}$$

39.2.

$\overline{BD}$ je tetiva te kružnice, β je središnji a α obodni kut

$$\Rightarrow \beta=2\alpha \Rightarrow \boxed{\beta=143°08}$$

40.

$$\frac{(n+2)!-(n+1)!}{(n-1)!}=\frac{(n+1)!\,(n+2-1)}{(n-1)!}=\frac{(n-1)!\cdot(n+1)\cdot n\cdot(n+1)}{(n-1)!}$$

$=n(n+1)^2$ a jedan od brojeva n i $n+1$ mora biti paran

41.

$$f(x)=x^2-4kx+5k^2-6k,\quad x_1-x_2=6$$

$$x_1+x_2=-\frac{b}{a}=4k \qquad x_1x_2=4k^2-9=5k^2-6k$$

$$\left.\begin{aligned}x_1-x_2&=6\\ x_1+x_2&=4k\end{aligned}\right\}+$$

$$2x_1=6+4k$$

$$x_1=2k+3$$

$$x_2=x_1-6$$

$$x_2=2k-3$$

$$k^2-6k+9=0$$

$$(k-3)^2=0$$

$$\boxed{k=3}$$

42. $f(x)=\frac{\sqrt{2x+a}}{46-3x}$, $D_f=[-5,+\infty\rangle\setminus\{2\}$

$2x+a\geq 0$

$2x\geq -a$

$x\geq -\frac{a}{2}$

$-\frac{a}{2}=-5 \Rightarrow \boxed{a=10}$

$46-3x\neq 0$

$3x\neq 46$

$x\neq \frac{46}{3}=2$

$\Rightarrow \boxed{b=\frac{3}{2}}$

43. Sa slike se očitava $D=-2$, $T=8$

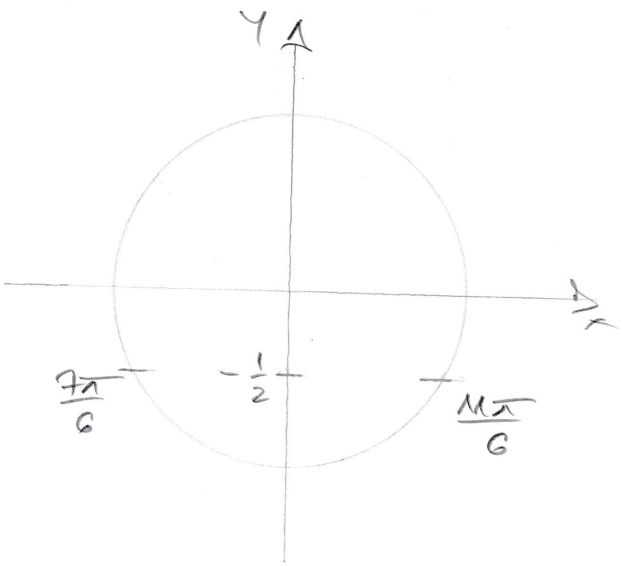
$T=\frac{2\pi}{B}=8 \Rightarrow B=\frac{\pi}{4}$

$\Rightarrow f(x)=-4\sin\left(\frac{\pi}{4}x\right)-2$

$-4\sin\left(\frac{\pi}{4}x\right)-2=0$

$-4\sin\left(\frac{\pi}{4}x\right)=2$

$\sin\left(\frac{\pi}{4}x\right)=-\frac{1}{2}$



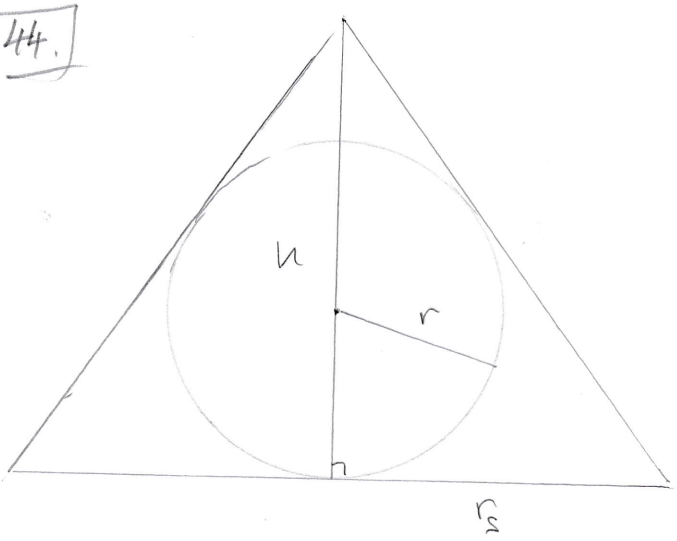
$\frac{\pi x}{4}=\frac{7\pi}{6}+2k\pi,\ k\in\mathbb{Z} \ /\cdot\frac{4}{\pi}$

$x=\frac{14}{3}+8k,\ k\in\mathbb{Z}$

$\frac{\pi x}{4}=\frac{11\pi}{6}+2k\pi,\ k\in\mathbb{Z} \ /\cdot\frac{4}{\pi}$

$x=\frac{22}{3}+8k,\ k\in\mathbb{Z}$

44.



$r_s = 5,\ h = 12 \Rightarrow l_s = 13$

$P_T = \frac{1}{2} \cdot 2r_s \cdot h = 60$

$P = r_k s$

$60 = r_k \cdot \frac{2 \cdot l_s + 2r_s}{2}$

$120 = r_k \cdot (2 \cdot 13 + 2 \cdot 5)$

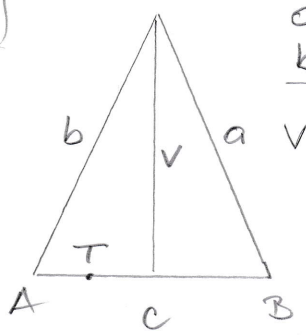
$120 = r_k \cdot 36 \Rightarrow r_k = \frac{10}{3}$

$V_s = \frac{1}{3} B \cdot h = \frac{1}{3} r_s^2 \pi \cdot h = \frac{1}{3} \cdot 5^2 \cdot \pi \cdot 12 \Rightarrow V_s = 100\pi$

$V_k = \frac{4}{3} r_k^3 \pi = \frac{4}{3} \left(\frac{10}{3}\right)^3 \pi = \frac{4000}{81}\pi$

$\varphi = \frac{V_k}{V_s} \Rightarrow \boxed{\varphi = \frac{40}{81}}$

45.



$a \ldots x + 3y = 0$

$b \ldots 3x + y = 0$

$v \ldots \frac{x+3y}{\sqrt{1+9}} + \frac{3x+y}{\sqrt{9+1}} = 0$

$4x + 4y = 0$

$v \ldots x + y = 0$

$k_v = -1 \Rightarrow k_c = 1$

$y + 5 = 1(x + 3) \Rightarrow c \ldots x - y - 8 = 0$

$x + 3y = 0$	$x + 3y = 0$ } −	$3x + y = 0$ } +	
$3x + y = 0$	$x - y - 8 = 0$	$x - y - 8 = 0$	
$y = -3x$	$4y + 8 = 0$	$4x - 8 = 0$	
$x - 9x = 0$	$y = 2$	$x = 2$	
$x = 0$	$x = 6$	$y = -6$	
$y = 0$			
$C(0,0)$	$B(6,-2)$	$A(2,-6)$	
$x_3\ y_3$	$x_2\ y_2$	$x_1\ y_1$	

$P = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$

$= \frac{1}{2} |2(-2 - 0) + 6(0 + 6) + 0(-6 + 2)|$

$= \frac{1}{2} |-4 + 36| \Rightarrow \boxed{P = 16}$

$V = Bh = 16 \cdot 8 \Rightarrow \boxed{V = 128}$

MATEMATIKA

OSNOVNA RAZINA

Šk. GOD. 2025./2026.

DEO

1. $\sqrt{-7} = \sqrt{7} \notin \mathbb{R}$ **3**

2. **D** (3.2)

3. $2-3(a+2)+6a:4+2:0.5 =$

$= 2-3a-6+\frac{3}{2}a+4 = -\frac{3}{2}a = \boxed{-1.5a}$ **A**

4. $a\sqrt{a^3} = a \cdot a^{\frac{3}{2}} = \boxed{a^{\frac{5}{2}}}$ **C**

5. vidi A.3.

6.
$$\begin{aligned} 2b+1.5o &= 19 \\ b+o &= 12 \quad /\cdot(-2) \\ \hline 2b+1.5o &= 19 \\ -2b-2o &= -24 \quad \} + \\ \hline -0.5o &= -5 \end{aligned}$$

$\Rightarrow \boxed{o = 10}$ **D**

7. vidi A.4.

8. $(x-x_1)(x-x_2) = (x+6)(x-7)$

$(2x+12)(x-7) = 0$ **C**

$2(x+6)(x-7) = 0$

9. $x^2-8x = p$

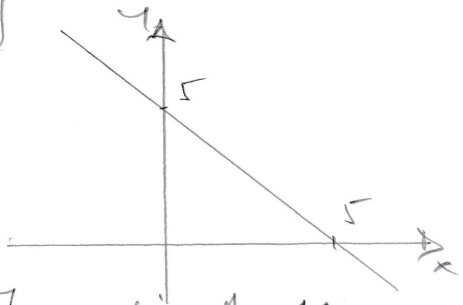
$x^2-8x-p = 0$

$D = 0$

$b^2-4ac = 64+4p = 0 \Rightarrow \boxed{p = -16}$ **A**

10. $\log_b a = 2 \Rightarrow b^2 = a \Rightarrow \boxed{b = \sqrt{a}}$ **D**

11.



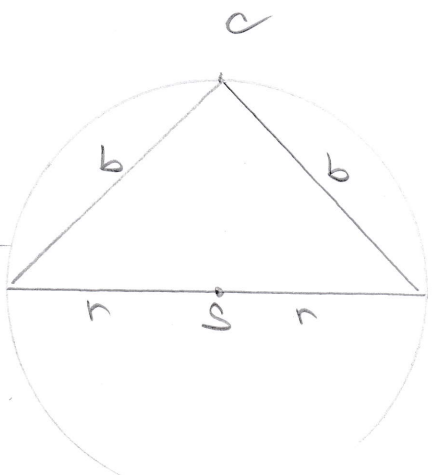
3

12. vidi A.11.

13. vidi A.14.

14. $2r = 8 \Rightarrow r = 4$

$2r = b\sqrt{2} \Rightarrow b = \frac{2 \cdot 4}{\sqrt{2}} = \frac{8}{\sqrt{2}}$



C

$P = \frac{1}{2}b^2 = \frac{1}{2} \cdot \left(\frac{8}{\sqrt{2}}\right)^2 \Rightarrow \boxed{P = 16}$

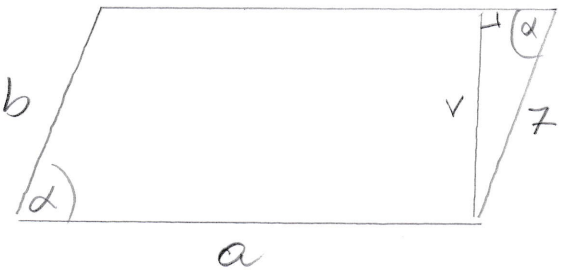
15. vidi A 18.

16. $T(2,y)$, $2x-y-8=0$

$2\cdot 2-y-8=0 \Rightarrow \boxed{y=-4}$

B

17.



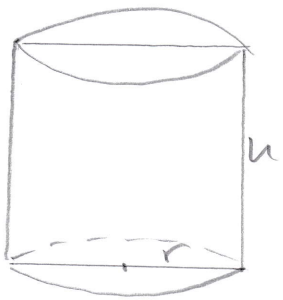
$\alpha = 42°12'$

$\sin\alpha = \frac{v}{7} \Rightarrow v = 7\sin 42°12'$

$\Rightarrow \boxed{v = 4.7}$

B

18.



$2r = 8 \Rightarrow r = 4$

$h = 8$

$\vartheta = 2B + P$

$\vartheta = 2r^2\pi + 2r\pi h$

$\vartheta = 2\cdot 4^2\pi + 2\cdot 4\cdot\pi\cdot 8$

$\boxed{\vartheta = 96\pi}$

D

19. $2,4\ \sqrt{7}\ 6,6,9$ $\Rightarrow$ možemo dopisati 3

A

20. $\frac{3}{8}$ mediana

B

21.

$48 = 2\cdot 24 = 2^2\cdot 12 = 2^3\cdot 6 = 2^4\cdot 3$

$128 = 2\cdot 64 = 2^2\cdot 32 = 2^3\cdot 16 = 2^4\cdot 8 = 2^5\cdot 4 = 2^6\cdot 2 = 2^7$

$\Rightarrow V(48,128) = 2^7\cdot 3$

$\boxed{V(48,128) = 384}$

22. vidi A 22.

23. $x\overline{ab} = 2\cdot 3\overline{a}\frac{b}{2}$

$x\overline{ab} = 3\overline{ab} \Rightarrow \boxed{x=3}$

24. $O:L:B = 3:5:7 \Rightarrow O=3k,\ L=5k,\ B=7k$

$3k = 45 \Rightarrow k = 15$, $B = 7k \Rightarrow \boxed{B = 105}$

25. $\frac{x+1}{4} - \frac{3x-2}{20} = 1 \ /\cdot 20$

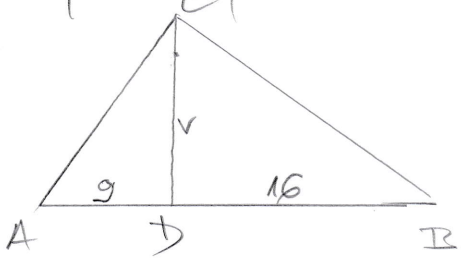
$5(x+1) - (3x-2) = 20$

$5x+5-3x+2 = 20$

$2x = 13 \Rightarrow \boxed{x = \frac{13}{2}}$

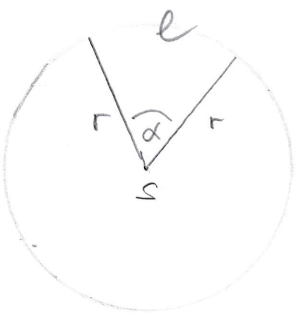
26. $xy=7544$
$x-y=10$
$x=y+10$
$(y+10)y=7544$
$y^2+10y-7544=0 \Rightarrow \boxed{y=82,\ x=92}$

27.



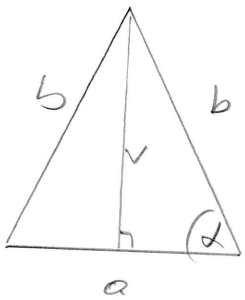
$v^2=9.16$
$\boxed{v=12}$

28.



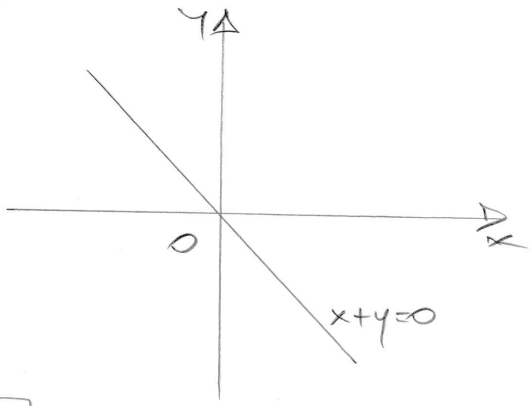
$r=4,\ P=7$
$P=\frac{r^2\pi\alpha}{360},\ l=\frac{r\pi\alpha}{180},\ P=\frac{r\cdot l}{2}$
$7=\frac{4\cdot l}{2} \Rightarrow \boxed{l=\frac{7}{2}}$

29.



$\alpha=54°,\ a=3$
$\cos\alpha=\frac{\frac{a}{2}}{b} \Rightarrow b=\frac{a}{2\cos\alpha} \Rightarrow \boxed{b=2.55}$

30.



31.1. $+(0,-2),\ (2,-1)$

$f(x)=a(x-x_0)^2+y_0$
$f(x)=ax^2-2$
$-1=a\cdot 2^2-2$
$4a=1 \Rightarrow a=\frac{1}{4}$
$\Rightarrow f(x)=\frac{1}{4}x^2-2$

31.2. $S_f=[-2,+\infty\rangle$

32.1. $N = 20 + 100 \cdot 0.50 \Rightarrow \boxed{N = 70}$

32.2. $5 = x \cdot 0.5 \Rightarrow x = 10 \Rightarrow \boxed{N = 100 + 10 = 110}$

33.1. $P = 393, a = 26, b = 35$

$P = \frac{1}{2} ab \sin\gamma$

$\sin\gamma = \frac{2P}{ab} \Rightarrow \boxed{\gamma = 59°44'19''}$

33.2. $V = \frac{1}{3} Bh = \frac{1}{3} \cdot 393 \cdot 11 \Rightarrow \boxed{V = 1441}$

34.1. $B - A = 3.2 \cdot 10^{26} - 6.4 \cdot 10^{25} = 3.2 \cdot 10^{25}(10 - 2) = 25.6 \cdot 10^{25}$

$= \boxed{2.56 \cdot 10^{26}}$

34.2. $B = \sqrt{AC} \Rightarrow C = \frac{B^2}{A} = \frac{(3.2 \cdot 10^{26})^2}{6.4 \cdot 10^{25}} = \boxed{1.6 \cdot 10^{27}}$

35.1. Panonska Hrvatska

35.2. $100 - 51.8 - 45.6 = 2.6$

$2.6\ \%$ od $3306000 = \boxed{85956}$