

TEST

- ① PLAŠT STOŠCA JE KRUŽNI ISJEČAK ROLUMJERA 8 cm I SREDIŠNJEG KUTA 135°. IZRAČUNAJ OPLOŠJE I OBUJAM STOŠCA

-15

$$s = 8 \text{ cm}$$

$$\angle = 135^\circ$$

$$O, V = ?$$

$$P_p = \frac{52\pi d}{360^\circ}$$

$$P_p = 24\pi$$

$$P = r\pi s$$

$$r = \frac{P}{\pi s}$$

$$r = 3 \text{ (+1)}$$

$$B = r^2\pi$$

$$B = 9\pi \text{ (+1)} \quad O = B + P = 33\pi \text{ (+1)}$$



$$h = \sqrt{s^2 - r^2}$$

$$h = \sqrt{55} \text{ (+1)}$$

$$V = \frac{r^2\pi h}{3}$$

$$V = 61.8960 \text{ cm}^3 \text{ (+1)}$$

- ② PLAŠT VALJKA IMA POUŠINU $72\pi \text{ cm}^2$, A OPSEG OSNOVKE JE $12\pi \text{ cm}$. ODREDITE OPLOŠJE I OBUJAM TOG VALJKA.

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$$P = 72\pi \text{ cm}^2$$

$$O_B = 12\pi \text{ cm}$$

$$O, V = ?$$

$$O_B = 2r\pi$$

$$12\pi \text{ cm} = 2r\pi$$

$$r = 6 \text{ cm (+1)}$$

$$O_B = r^2\pi$$

$$B = 36\pi \text{ cm}^2 \text{ (+1)}$$

$$O = 2B + P$$

$$O = 144\pi \text{ cm}^2 \text{ (+1)}$$

$$V = B \cdot h$$

$$P = 2r\pi h$$

$$h = \frac{P}{2r\pi}$$

$$h = 1.9099 \text{ cm (+1)}$$

$$V = 216.0046 \text{ cm}^3 \text{ (+1)}$$

- ③ OSNOVKA PIRAMIDE JE TROKUT SA STRANICAMA 15 cm, 16 cm i 17 cm. BOČNI BRIDOV I PIRAMIDE S OSNOVKOM ZATVARAJU KUT OD 45°. KOLIKI JE OBUJAM PIRAMIDE?

-15

$$a = 15 \text{ cm}$$

$$b = 16 \text{ cm}$$

$$c = 17 \text{ cm}$$

$$d = 45^\circ$$

$$V = ?$$

$$V = \frac{1}{3} B \cdot h$$

$$B = \sqrt{s(s-a)(s-b)(s-c)}$$

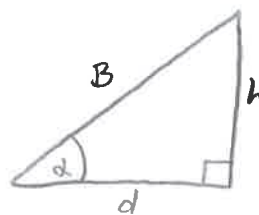
$$s = \frac{a+b+c}{2} = 24$$

$$B = 24\sqrt{21} \text{ (+1)}$$

$$V_b = ?$$

$$B = \frac{b \cdot V_b}{2}$$

$$V_b = \frac{2B}{b} = 3\sqrt{21} \text{ (+1)}$$



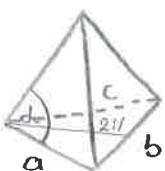
$$h = \text{tg} d \cdot d$$

$$h = 2\sqrt{21} \text{ (+1)}$$

$$V = 336 \text{ cm}^3 \text{ (+1)}$$

$$d = 2\sqrt{21} \text{ (+1)}$$

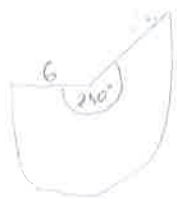
$$\text{tg} d = \frac{h}{d}$$



5. PISANA PROJEKTA

(2. d)

1) Izračunajmo oplošje i volumen stošca čiji je plašt prikazan na slici.



$$\begin{aligned} s &= 6 \\ \alpha &= 240^\circ \\ O, V &= ? \end{aligned}$$

$$\frac{r}{s} = \frac{\alpha}{360^\circ} \rightarrow r = \frac{\alpha \cdot s}{360^\circ} = 4$$

$$s^2 = h^2 + r^2 \rightarrow h = \sqrt{s^2 - r^2} = 2\sqrt{5}$$

$$\begin{aligned} O &= r\pi(r+s) \\ &= 40\pi \quad +1 \end{aligned}$$

$$V = \frac{r^2 \pi h}{3} = \frac{32\sqrt{5}\pi}{3} \quad +1$$

2) Prizma i piramida imaju osnovke jednakih površina, a visine su im jednake dužina. Ako je datam prizme 63 cm^3 , koliki je datam piramide?

$$V_p = 63 \quad h_p = h_{pir}$$

$$V_{pir} = \frac{B \cdot h}{3} \quad | \cdot 3$$

$$V_p = 3V_{pir} \quad | : 3$$

$$V_{pir} = ? \quad B_p = B_{pir}$$

$$3V_{pir} = B \cdot h \quad +1$$

$$V_{pir} = \frac{V_p}{3}$$

$$\begin{aligned} V_p &= B \cdot h \\ 63 &= B \cdot h \end{aligned}$$

$$V_{pir} = 21 \quad +1$$

3) Oplošje valjka je $112\pi \text{ cm}^2$. Duljine polumjera osnovke i visine valjka u omjeru 2:5, koliki je obujam valjka?

$$\begin{aligned} O &= 112\pi \text{ cm}^2 \\ r:h &= 2:5 \\ V &= ? \end{aligned}$$

$$\begin{aligned} O &= 2B + P \\ 112\pi &= 2r^2\pi + 2r\pi \cdot h \\ 112 &= 2r(r+h) \\ 112 &= 2 \cdot \frac{2}{5}h \left(\frac{2}{5}h + h \right) \\ 112 &= \frac{4}{5}h \left(\frac{7h}{5} \right) \quad +1 \\ 112 &= \frac{28}{25}h^2 \\ h &= 10 \end{aligned}$$

$$r = \frac{2}{5}h = 4$$

$$\begin{aligned} V &= B \cdot h \\ &= r^2\pi h \\ &= 160\pi \quad +1 \end{aligned}$$

4) Baza uspravne prizme je trokut sa stranicama a, b i c. Visina prizme jednaka je najvećoj visini osnovke. Odredi volumen i oplošje.

$$\begin{aligned} a &= 5,66 \\ b &= 4,47 \\ c &= 6 \end{aligned}$$

h = najveća visina osnovke

$$O, V = ?$$

$$B = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2}$$

$$s = 12 \quad +1$$

$$s = 8,07$$

$$P_a = \frac{b \cdot h}{2} \quad | \cdot 2 : b$$

$$h = \frac{2P_a}{b}$$

$$h = 5,37$$

$$O = 2B + P$$

$$V = B \cdot h$$

$$O = 110,56$$

$$V = 64,4$$

+1

+1

1. Zadatak

Površina osnove pravilne četverostrane piramide je 484 cm^2 , a površina piramide iznosi 2684 cm^2 . Koliki je obujam piramide?

$P_o = B = 484$

$V = \frac{1}{3} B \cdot h$

$O = 2684$

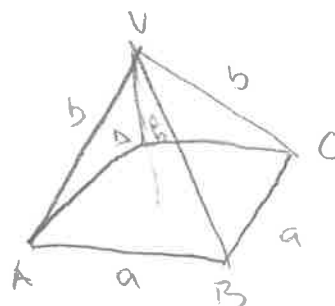
$V = ?$

1. $a = ?$

$B = a^2$

$a^2 = 484 / \sqrt{\quad}$

$a = 22$

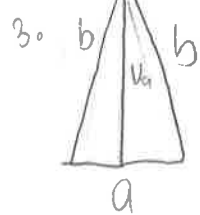


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2. $O = B + 4P_{\Delta}$

$4P_{\Delta} = O - B / 4$

$P_{\Delta} = 550$



$P_{\Delta} = \frac{aV_a}{2}$

$V_a = \frac{2P_{\Delta}}{a} = 50$

$b^2 = \sqrt{Va^2 + (\frac{a}{2})^2} = 51,19$



$b^2 = h^2 + (\frac{a\sqrt{2}}{2})^2$

$h = \sqrt{b^2 - (\frac{a\sqrt{2}}{2})^2}$

$h = 48,769$

$V = \frac{1}{3} B \cdot h$

$V = \frac{1}{3} \cdot 484 \cdot 48,769 = 7869$



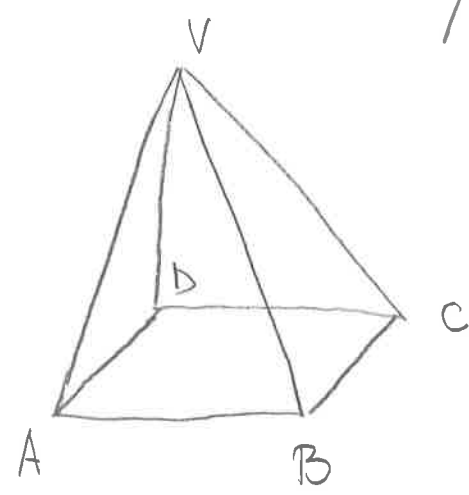
2. U katalom su međusobnom odnosu zadani pravci?

a) AB i VB - sijeku se (+1)

b) AB i CS - paralelni su (+1)

c) AC i BD - sijeku se i okomiti su (+1)

d) AB i VD - mimoilaze se (+1)



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1. Površine pobočki uspravne trostrane prizme iznose 425 cm^2 , 700 cm^2 i 975 cm^2 , visina je 25 cm . $O, V = ?$

Bodovi 21



$$P_1 = 425 \text{ cm}^2$$

$$P_2 = 700 \text{ cm}^2$$

$$P_3 = 975 \text{ cm}^2$$

$$P = P_1 + P_2 + P_3$$

$$P = 2100$$

$$O = 2B + P$$

$$O = 2B + P$$

$$B = 210$$

$$S = 42$$

$$P = 2120$$

$$O = 2520$$

$$425 = 25 \cdot a$$

$$a = 425 : 25$$

$$a_1 = 17$$

$$a_2 = 700 : 25$$

$$a_2 = 28$$

$$a_3 = 975 : 25$$

$$a_3 = 39$$



(+3)

2. $P = 544$

$B = 256$

$V = ?$

$$2P = a \cdot \sqrt{a} / a$$

$$B = a^2$$

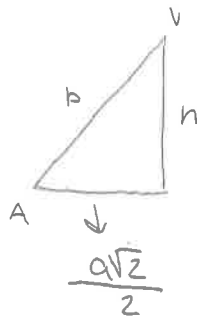
$$a^2 = 256 / r$$

$$a = 16$$

$$2P = a \cdot \sqrt{a} / a$$

$$\sqrt{a} = \frac{2P}{a}$$

$$\sqrt{a} = 17$$



$$b^2 = h^2 + \left(\frac{a\sqrt{2}}{2}\right)^2$$

$$h^2 = b^2 - \left(\frac{a\sqrt{2}}{2}\right)^2$$

$$h^2 = 224.69 / r$$

$$h = 14.99$$

$$h = 15$$

(+4)

$$V = \frac{1}{3} \cdot B \cdot h$$

$$V = 1280 \text{ cm}^3$$

3. Površina osnovnog presjeka je kvadrat površine 400.

$O, V = ?$



$$P_{\text{op}} = 400$$



$$2r = h$$

$$2r \cdot h = 400$$

$$h \cdot h = 400$$

$$h^2 = 400 / r$$

$$h = 20$$

$$r = 10$$

$$O = 2B + P$$

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

$$= 2r\pi(r + h)$$

$$O = 600\pi$$

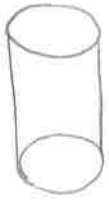
$$V = B \cdot h$$

$$= r^2\pi h$$

$$V = 2000\pi$$

(+3)

7. Visina valjka je za 10 cm veća od polumjera osnove, a oplošje valjka iznosi $144\pi \text{ cm}^2$. Odredi dužine polumjera osnove i visine valjka.



$$v = r + 10$$

$$O = 144\pi \text{ cm}^2$$

$$144\pi = 2r\pi (r + r + 10)$$

$$144\pi = 4r^2\pi + 20r\pi \quad | :4\pi$$

$$36 = r^2 + 5r$$

$$r^2 + 5r - 36 = 0$$

$$r_{1,2} = \frac{-5 \pm \sqrt{25 + 144}}{2} = \frac{-5 \pm \sqrt{169}}{2}$$

$$r = \frac{-5 + 13}{2} = 4 \text{ cm}$$

(+2)

$$v = 10 \text{ cm} + 4 \text{ cm} = 14 \text{ cm}$$

8. Površina plašta uspravnog stošca iznosi 20 cm^2 , a nakon razvijanja plašta u ravninu dobije se kružni isječak sa središnjim kutom 72° . Koliko je oplošje tog stošca?

$$r\pi s = 20$$

$$\alpha = 72^\circ$$

$$r\pi s = \frac{s^2 \pi \alpha}{360}$$

$$20 = \frac{s^2 \pi 72}{360}$$

$$s^2 = \frac{20 \cdot 360}{72 \pi}$$

$$s^2 = \frac{100}{\pi}$$

$$s = \frac{10}{\sqrt{\pi}}$$

$$r\pi s = 20$$

$$r\pi \frac{10}{\sqrt{\pi}} = 20$$

$$r10\sqrt{\pi} = 20$$

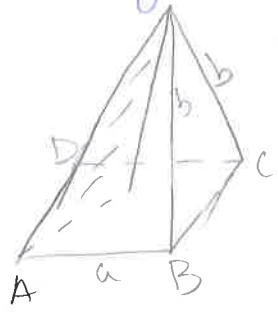
$$r = \frac{2}{\sqrt{\pi}}$$

(+2)

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1. Površina osnovke pravilne četverostrane piramide je 484 cm^2 , a oplošje piramide iznosi 2684 cm^2 . Koliki je obujam piramide?



$$B = 484 \text{ cm}^2$$

$$O = 2684 \text{ cm}^2$$

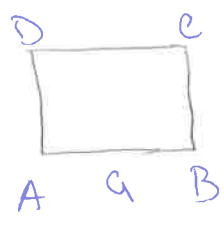
$$V = ?$$

$$O = B + P \rightarrow P = O - B$$

$$P_4 = 2684 - 484$$

$P_4 = 2200 \rightarrow$ sve 4 pobočke

$$P_1 = 2200 : 4 = 550 \text{ cm}^2$$



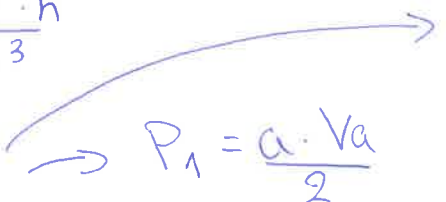
$$\Rightarrow B = a^2$$

$$a^2 = 484$$

$$a = 22 \text{ cm}$$

$$V = \frac{B \cdot h}{3}$$

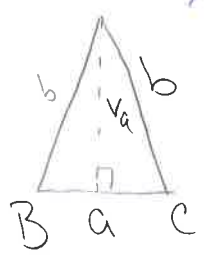
$$h = ?$$



$$b^2 = va^2 + \left(\frac{a}{2}\right)^2$$

$$b^2 = 2621/\sqrt{\quad}$$

$$b = 51.2$$



$$va = \frac{2P_1}{a} = \frac{2 \cdot 550}{22} = 50 \text{ cm}$$

$$b^2 = h^2 + \left(\frac{a\sqrt{2}}{2}\right)^2$$

$$h^2 = b^2 - \left(\frac{a\sqrt{2}}{2}\right)^2$$

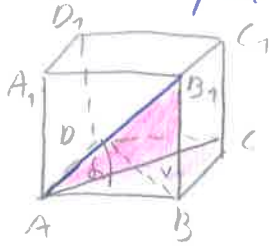
$$h^2 = 51.2^2 - \left(\frac{22\sqrt{2}}{2}\right)^2$$

$$h = 48.78$$

$$V = \frac{484 \cdot 48.78}{3}$$

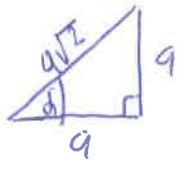
$$V = 7869.84$$

5. Koliki kut u loži ABCDA₁B₁C₁D₁ zatvara ravnina ABC i pravac AB₁.



$\alpha = ?$

$\text{tg } \alpha = \frac{a}{a}$



$\text{tg } \alpha = 1$

$\alpha = 45^\circ$

1. Ako je oplošje valjka $8\pi \text{ cm}^2$, a polupjeter osnovke jednak visini, izračunajte obujam valjka.

$$O_v = 8\pi \text{ cm}^2$$

$$r = h$$

$$V = ?$$

$$V = B \cdot h$$

$$V = 2\pi r^2 \text{ cm}^3$$

2/2

$$O = 2B + P$$

$$O = 2r\pi(r+h)$$

$$r = h$$

$$O = 4r^2\pi$$

$$r^2 = \frac{O}{4\pi} = \frac{8\pi}{4\pi} = 2$$

$$h = r = \sqrt{2}$$

2. Plašt valjka ima površinu $72\pi \text{ cm}^2$, a opseg osnovke $12\pi \text{ cm}$. Odredite oplošje i obujam tog valjka.

$$P_v = 72\pi \text{ cm}^2$$

$$O_{os} = 12\pi \text{ cm}$$

$$O_v, V_v = ?$$

$$P_v = 72\pi$$

$$P = 2r\pi h$$

$$h = \frac{P}{2r\pi} = \frac{72\pi}{2r\pi}$$

$$O = 2B + P$$

$$O_v = 2r\pi(r+h)$$

$$O_v = 144\pi \text{ cm}^2$$

$$O_{os} = 2r\pi$$

$$r = \frac{O}{2\pi} = \frac{12\pi}{2\pi} = 6$$

$$h = 6$$

$$V_v = B \cdot h$$

$$V_v = r^2\pi h$$

$$V_v = 216\pi \text{ cm}^3$$

3/3

3. Oplošje uspravnoga stošca jest $216\pi \text{ cm}^2$, a izvodnica je za 6 cm duža od polupjetera baze. Izračunaj volumen stošca.

$$O = 216\pi \text{ cm}^2$$

$$s = r + 6$$

$$V_s = ?$$

$$r = 9 \text{ cm}$$

$$V = \frac{r^2\pi h}{3}$$

$$s = 9 + 6 = 15 \text{ cm}$$

$$V = 324\pi \text{ cm}^3$$

$$s^2 = r^2 + h^2$$

$$h^2 = s^2 - r^2$$

$$h = 12 \text{ cm}$$

4/4

$$O = r\pi(r+s)$$

$$216\pi = r\pi(r+r+6)$$

$$\frac{216\pi}{108} = \frac{r\pi(2r+6)}{r \cdot 2(r+3)} \quad | : \pi$$

$$r^2 + 3r - 108 = 0$$

4. Izračunaj oplošje i volumen uspravnoga stošca čiji je polupjeter baze 8 cm, a izvodnica 17 cm.

$$r = 8 \text{ cm}$$

$$s = 17 \text{ cm}$$

$$O, V = ?$$

$$h^2 = s^2 - r^2$$

$$h = 15 \text{ cm}$$

$$V = \frac{r^2\pi h}{3} = 320\pi \text{ cm}^3$$

2/2

$$O = r\pi(r+s)$$

$$= 8\pi(8+17) = 200\pi \text{ cm}^2$$

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⑥ $h = 10 + r$

$O = 144\pi$

$r = ? , h = ?$

[2]

$h = 10 + r$

$h = 10 + 4$

$h = 14$

$O = 2B + P$

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

$O = 2r^2\pi + 2r\pi(10+r)$

$O = 2r^2\pi + 20r\pi + 2r^2\pi$

$O = 4r^2\pi + 20r\pi$

$144\pi = 4r^2\pi + 20r\pi \quad | : \pi$

$144 = 4r^2 + 20r \quad | : 4$

$36 = r^2 + 5r$

$O = r^2 + 5r - 36$

$r_1 = 4 \quad \checkmark$

$r_2 = -9 \quad \times$

⑦ $s = 20 \text{ cm}$

$O = 384\pi \text{ cm}^2$

$V = ?$

$r^2\pi + r\pi s$

$384\pi = r^2\pi + 20r\pi \quad | : \pi$

$384 = r^2 + 20r$

$O = r^2 + 20r - 384$

$r_1 = 12 \quad \checkmark$

$r_2 = -36 \quad \times$



$r^2 + h^2 = s^2$

$h^2 = s^2 - r^2 \quad | \sqrt{\quad}$

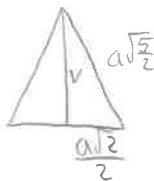
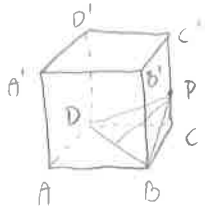
$h = \sqrt{s^2 - r^2}$

$h = 16$

$V = \frac{r^2\pi h}{3}$

$V = 768\pi$

⑧



$c^2 = \left(\frac{a^2}{2}\right) + a^2$

$c^2 = \frac{a^2}{4} + a^2$

$c^2 = \frac{a^2}{4} + \frac{4a^2}{4}$

$c^2 = \frac{5a^2}{4}$

$v = \left(\frac{a\sqrt{2}}{2}\right)^2 - \left(a\sqrt{\frac{3}{2}}\right)^2$

$v = \left(a\sqrt{\frac{3}{2}}\right)^2 - \left(\frac{a\sqrt{2}}{2}\right)^2$

$V = 2a$

$V = a\sqrt{2}$