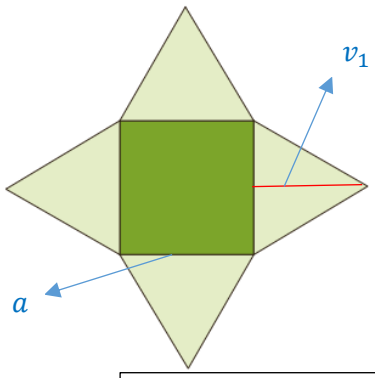
Str. 114

2. Izmeri ustrezne količine, zapiši meritev in izračunaj površino pokončne štiristrane piramide.

a)



Meritev: $a = 2cm, v_1 = 1{,}7cm$

$$P = O + pl$$

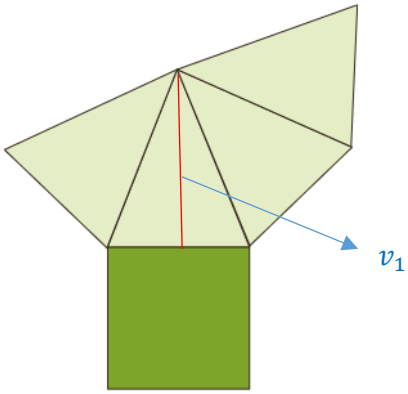
$$O = a^2 = 4\ cm^2$$

$$pl = 4\frac{a \cdot v_1}{2} = 4\frac{2 \cdot 1{,}7}{2} = 6{,}8\ cm^2$$

$$P = 4 + 6{,}8 = 10{,}8\ cm^2$$

Str. 115

b)



Meritev: $a = 2cm, v_1 = 2{,}5cm$

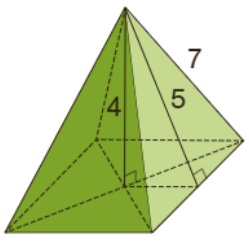
$$P = O + pl$$

$$O = a^2 = 4\ cm^2$$

$$pl = 4\frac{a \cdot v_1}{2} = 4\frac{2 \cdot 2{,}5}{2} = 10\ cm^2$$

$$P = 14\ cm^2$$

3. Slika prikazuje pravilno štiristrano piramido. Dolžine so izražene v centimetrih. Zapiši, koliko meri:



Reševanje:

$${v_1}^2 = v^2 + \left(\frac{a}{2}\right)^2$$

$$\left(\frac{a}{2}\right)^2 = {v_1}^2 - v^2 = 25 - 16 = 9 \rightarrow \frac{a}{2} = 3 \rightarrow \boldsymbol{a = 6\ cm}$$

$$Vsota\ robov = 4a + 4s = 4 \cdot 6 + 4 \cdot 7 = 52\ cm$$

$$O = a^2 = 36\ cm^2, \quad pl = 4\frac{a \cdot v_1}{2} = 4\frac{6 \cdot 5}{2} = 60\ cm^2$$

$$P = O + pl = 36 + 60 = 96\ cm^2$$

$$V = \frac{O \cdot v}{3} = \frac{36 \cdot 4}{3} = 48\ cm^3$$

a) vsota dolžin vseh robov 52 cm

b) ploščina osnovne ploskve $36cm^2$

c) ploščina plašča $60cm^2$

č) površina piramide $96\ cm^2$

d) prostornina piramide $48\ cm^3$

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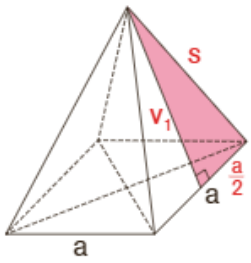
6. Izračunaj neznano količino pravilne štiristrane piramide na sliki.

a) s = 5 cm
a = 6 cm
v_1 = ?



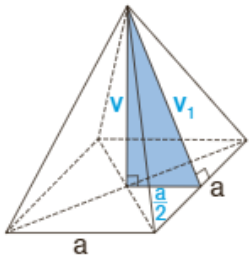
Uporabimo Pitagorov izrek:

$$s^2 = {v_1}^2 + \left(\frac{a}{2}\right)^2$$

$${v_1}^2 = s^2 - \left(\frac{a}{2}\right)^2 = 25 - 9 = 16$$

$$v_1 = 4\ cm$$

b) v_1 = 17 cm
v = 15 cm
a = ?



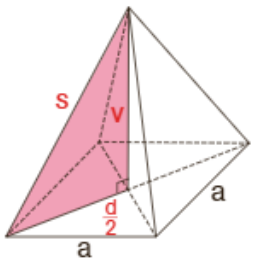
Uporabimo Pitagorov izrek:

$${v_1}^2 = v^2 + \left(\frac{a}{2}\right)^2$$

$$\left(\frac{a}{2}\right)^2 = {v_1}^2 - v^2 = 289 - 225 = 64$$

$$\frac{a}{2} = 8 \rightarrow a = 16\ cm$$

c) d = 14 cm
v = 24 cm
s = ?



Uporabimo Pitagorov izrek:

$$s^2 = v^2 + \left(\frac{d}{2}\right)^2$$

$$s^2 = 24^2 + 7^2 = 625$$

$$s = 25\ cm$$

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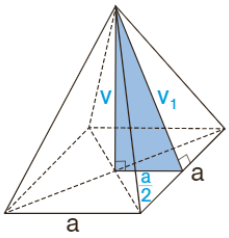
7. Izračunaj ploščino plašča pravilne štiristrane piramide s podatkoma:

a) a = 6 cm
v = 4 cm
pl = ?

Skica



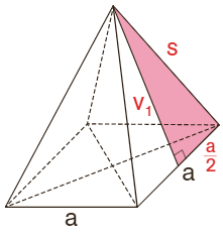
$v_1{}^2 = v^2 + \left(\frac{a}{2}\right)^2 = 16 + 9 = 25$

$v_1 = 5\ cm$

$pl = 4\frac{a \cdot v_1}{2} = 4\frac{6 \cdot 5}{2} = 60\ cm^2$

b) v_1 = 15 cm
s = 17 cm
pl = ?

Skica



$s^2 = v_1{}^2 + \left(\frac{a}{2}\right)^2$

$\left(\frac{a}{2}\right)^2 = s^2 - v_1{}^2 = 289 - 225 = 64$

$\frac{a}{2} = 8 \ \rightarrow \ a = 16\ cm$

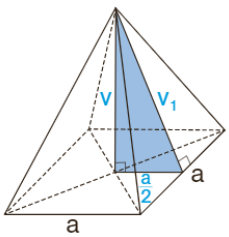
$pl = 4\frac{a \cdot v_1}{2} = 4\frac{16 \cdot 15}{2} = 480\ cm^2$

Str.118

8. Osnovni rob pravilne štiristrane piramide meri 6 cm, višina stranske ploskve pa 5 cm. Izračunaj:

a) višino piramide,
b) površino piramide,
c) prostornino piramide.

Skica



$v_1{}^2 = v^2 + \left(\frac{a}{2}\right)^2$

$v^2 = v_1{}^2 - \left(\frac{a}{2}\right)^2 = 25 - 9 = 16 \ \rightarrow \ v = 4\ cm$

$O = a^2 = 36\ cm^2, \ pl = 4\frac{a \cdot v_1}{2} = 4\frac{6 \cdot 5}{2} = 60\ cm^2$

$P = O + pl = 36 + 60 = 96\ cm^2$

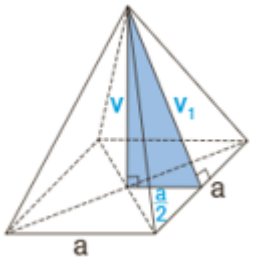
$V = \frac{O \cdot v}{3} = \frac{36 \cdot 4}{3} = 48\ cm^3$

Str.119

9. Izračunaj površino ali prostornino pravilne štiristrane piramide.

a) $a = 14\ cm$
$v_1 = 25\ cm$
$V = ?$

Skica



$$v_1{}^2 = v^2 + \left(\frac{a}{2}\right)^2$$

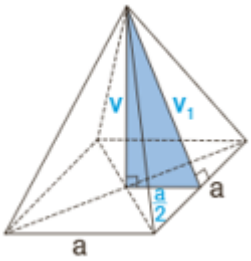
$$v^2 = v_1{}^2 - \left(\frac{a}{2}\right)^2 = 625 - 49 = 576$$

$$\boldsymbol{v = 24\ cm}$$

$$\boldsymbol{V} = \frac{a^2 \cdot v}{3} = \frac{196 \cdot 24}{3} = \boldsymbol{1568\ cm^3}$$

b) $v_1 = 15\ cm$
$v = 12\ cm$
$P = ?$

Skica



$$v_1{}^2 = v^2 + \left(\frac{a}{2}\right)^2$$

$$\left(\frac{a}{2}\right)^2 = v_1{}^2 - v^2 = 225 - 144 = 81$$

$$\frac{a}{2} = 9 \rightarrow \boldsymbol{a = 18\ cm}$$

$$O = a^2 = 324\ cm^2$$

$$pl = 4\frac{a \cdot v_1}{2} = 4\frac{18 \cdot 15}{2} = 540\ cm^2$$

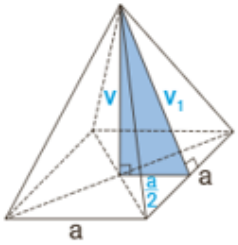
$$\boldsymbol{P} = \boldsymbol{O} + \boldsymbol{pl} = \boldsymbol{864\ cm^2}$$

Str.121

12. Izračunaj prostornino pravilne štiristrane piramide s podatkoma:

a) a = 8 cm
v_1 = 5 cm
V = ?

Skica



$$v_1{}^2 = v^2 + \left(\frac{a}{2}\right)^2$$

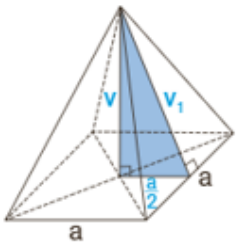
$$v^2 = v_1{}^2 - \left(\frac{a}{2}\right)^2 = 25 - 16 = 9$$

$$\boldsymbol{v = 3\ cm}$$

$$\boldsymbol{V = \frac{a^2 \cdot v}{3} = \frac{64 \cdot 3}{3} = 64\ cm^3}$$

b) v = 8 dm
v_1 = 1 m → 10 dm
V = ?

Skica



$$v_1{}^2 = v^2 + \left(\frac{a}{2}\right)^2$$

$$\left(\frac{a}{2}\right)^2 = v_1{}^2 - v^2 = 100 - 64 = 36$$

$$\frac{a}{2} = 6 \rightarrow a = 12\ cm$$

$$\boldsymbol{V = \frac{a^2 \cdot v}{3} = \frac{144 \cdot 8}{3} = 384\ cm^3}$$