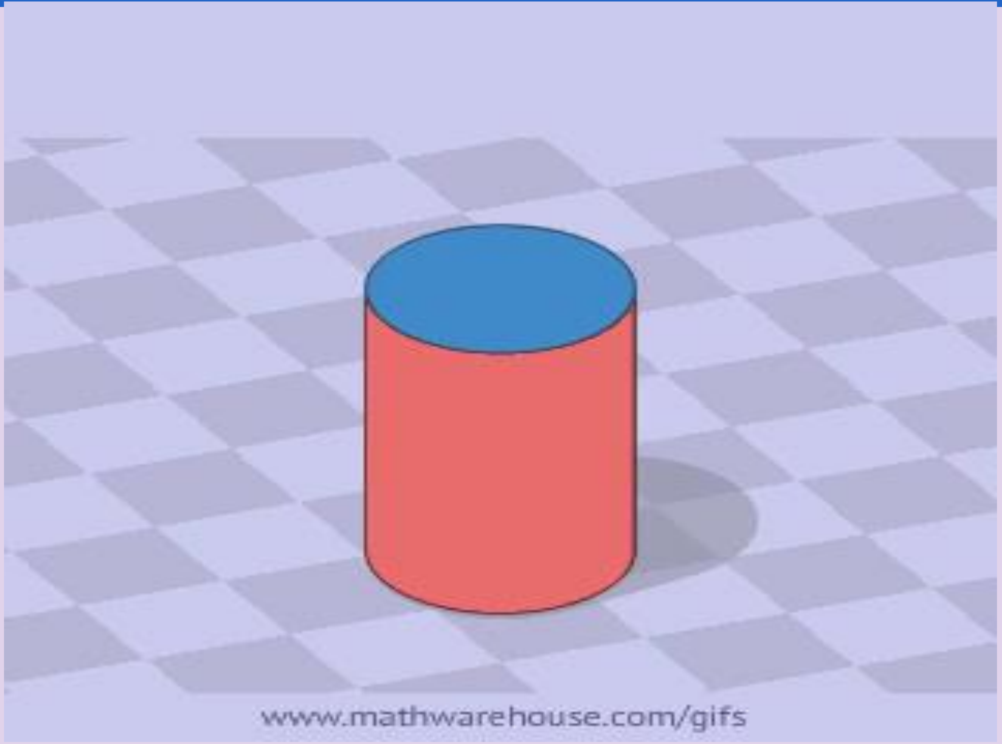
Agzamxodjaeva M.Sh

16-17-Mavzu: Fazoviy jismlarning kombinatsiyalari xossalariga va stereometriyadan amaliy masalalarni yechish

DARSNING MAQSADI

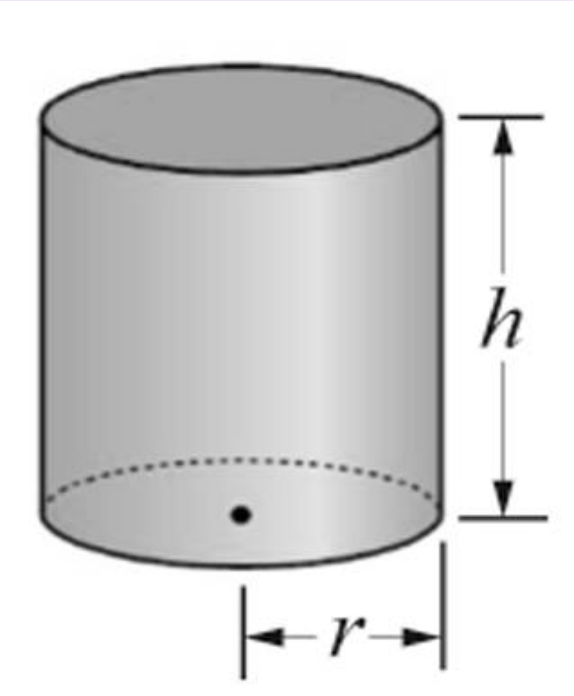
- Stereometriyada o`rganiladigan barcha fazoviy jismlar haqidagi tushuncha va tasavvurlarni shakllantirish, ularning ta’riflari, xossa, formulalari va ulardan kelib chiqadigan natijalarni bilish
- Stereometriyadan fazoviy jismlarning kombinatsiyalariga oid amaliy masalalarni yechish

SILINDR



Parallel ko`chirish bilan ustma-ust joylashadigan va bitta tekislikda yotmaydigan ikki doiradan va bu doiralarning mos nuqtalarini tutuashtiruvchi hamma parallel to`g`ri chiziq kesmalaridan tashkil topgan jism **silindr** (doiraviy silindr) deyiladi. Doiralar silindrning asoslari deyiladi. Parallel ko`chirishda tekislik parallel tekislikka (yoki o`ziga) o`tgani uchun silindrning asoslari parallel tekisliklarda yotadi

SILINDR FORMULALARI



1. $S_{yon} = 2\pi rh$
2. $S_{to'la} = 2S_{asos} + S_{yon} = 2\pi r^2 + 2\pi rh$
3. $V_{silindr} = \pi R^2 h$
4. $S_{o'q\ kesm} = 2Rh$

Fazoviy jismlarning kombinatsiyalariga doir formulalar

1. **Kubga ichki chizilgan shar radiusi:** $r=\frac{a}{2}$

2. **Kubga tashqi chizilgan shar radiusi:** $r=a\frac{\sqrt{3}}{2}$

3. **Konusga ichki chizilgan shar** $= \frac{RH}{L+R}$

4. **Konusga tashqi shar chizilsa shar radiusi:** $R= \frac{R^2+H^2}{2H}$

5. **Silindrga tashqi shar chizilsa, u teng tomonli bo'lish shart:** $R_{shar}= R_{slindr}$

6. **Slindrga tashqi aylana chizilsa:** $R= \frac{\sqrt{H^{2+4}r^{2}}}{2}$

SILINDRGA ICHKI CHIZILGAN SHAR

27-masala
DTM 2019

27-masala (01-9-20): Silindrga shar ichki chizilgan. Silindrning hajmi 16π ga teng bo'lsa sharning hajmini toping.

Yechish:

$V=\pi R^2 H=16\pi$

$H=2R$

$R^2 H=16$

$2R^3=16$

$R^3=8$

$R=2$

$V_{shar}=\frac{4}{3}\pi R^3$

$V_{shar}=\frac{4}{3}\pi\, 8=\frac{32\pi}{3}$

Javob: $\frac{32\pi}{3}$

MASALALAR YECHISH

TIIAME

29-masala
DTM 2019

29-masala (02-3-70): Radiusi 6 ga teng bo’lgan metal shardan eng katta hajmli silindr yo’nilgan. Silindr asosini radiusi nechaga teng.

Yechish:

$$V_{silindr}=\pi r^2 h=\pi\left(R^2-\frac{H^2}{4}\right)H=36\pi H-\frac{\pi}{4}H^3$$

$$V_{silindr}'=\left(36\pi H-\frac{\pi H^3}{4}\right)'=0$$

$$36\pi-\frac{3\pi H^2}{4}=0$$

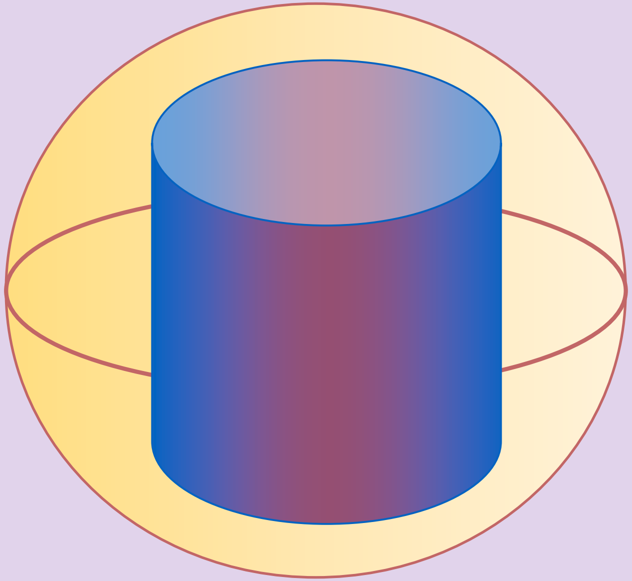
$$3\pi\frac{H^2}{4}=36\pi$$

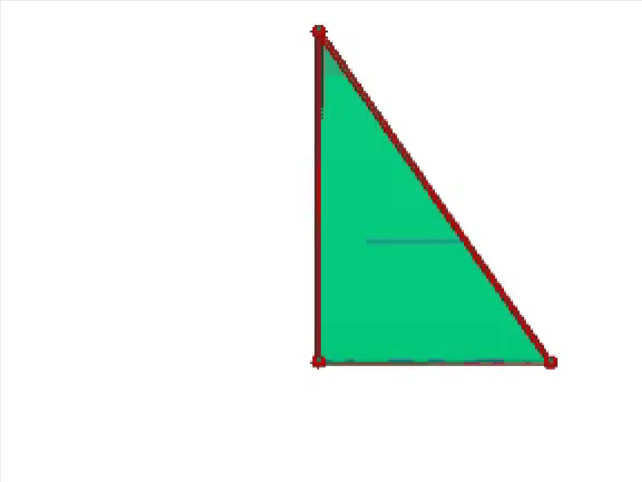
$$H=4\sqrt{3}$$

$$(2r)^2=(2R)^2-H^2$$

$$r=2\sqrt{6}$$

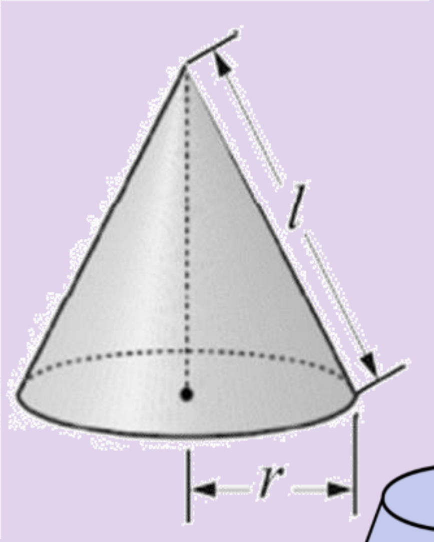
Javob: $2\sqrt{6}$

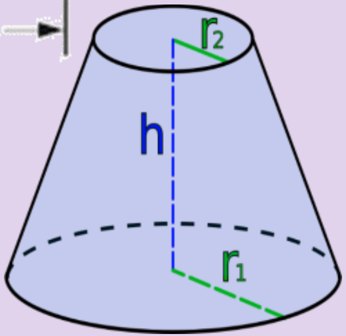




Konus (doiraviy konus) deb shunday jismga aytiladiki, u doira – *konus asosidan*, shu doira tekisligida yotmagan nuqta – *konusning uchidan* va konusning uchini asosining hamma nuqtalari bilan tutashtiruvchi kesmalardan iborat bo`ladi. Konus uchini asos aylanasi nuqtalari bilan tutashtiruvchi kesmalar konusning yasovchilari deyiladi.

KONUS FORMULALARI





$$S_{yon}=\pi rl$$

$$S_{to'la}=S_{asos}+S_{yon}=\pi r^2+\pi rl$$

$$V_{konus}=\frac{1}{3}\pi R^2 h$$

$$V_{k.konus}=\frac{1}{3}\pi h\,(r_1^2+r_1r_2+r_2^2)$$

$L=R+r$ $\quad H=2\sqrt{Rr}$ $\quad r_{shar}=\sqrt{Rr}$

KONUSGA ICHKI CHIZILGAN SHAR

57-masala
DTM 2019

57-masala: Sharga tashqi chizilgan kesik konus asosining radiuslar 3 va 6 ha teng. Kesik konus to'la sirtining shar sirtiga nisbatini toping.

Yechish:

$\mathbf{r_1 = 3 \quad r_2 = 3 \quad h=\sqrt{81-9}=6\sqrt{2}}$

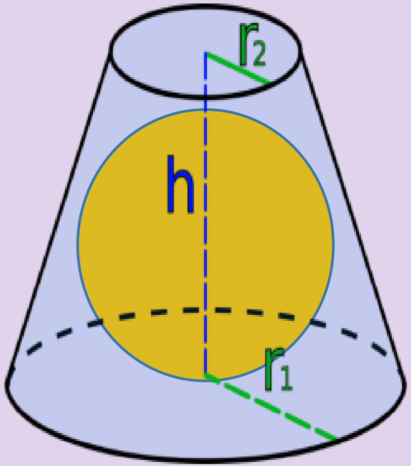
$\mathbf{S_{sfera} = 4\pi r^2}$, $R=\frac{h}{2}=\frac{6\sqrt{2}}{2}=3\sqrt{2}$

$\mathbf{S_{sfera} = 4\pi\ 18=72\pi}$

$V_{k.konus} = \frac{1}{3}\pi h\,(r_1^2 + r_1 r_2 + r_2^2)=126\pi$

$\frac{V_{k.konus}}{S_{sfera}} = \frac{7}{4}$

Javob: $\frac{7}{4}$



KONUSGA ICHKI CHIZILGAN SHAR

32-masala
DTM 2019

32-masala: Kesik konusga shar ichki chizilgan. Agar kesik konus asoslarining radiuslari 2 va 4 bo'lsa , shu konus yon sirtining yuzini toping.

Yechish:

$$S_{yon} = (r+R)l\pi$$

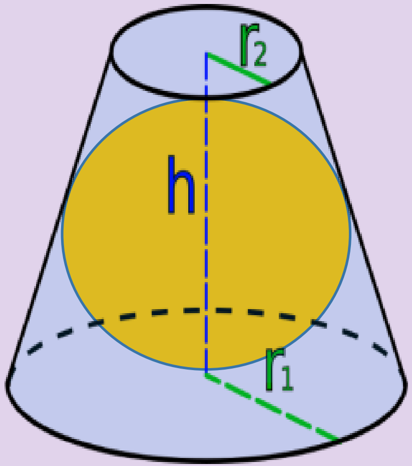
$r=2$ $\quad$ $l=R+r=2+4=6$

$R=4$ $\quad$ $S_{yon} = (r+R)l\pi$

$=(2+4)6\pi=36\pi$

$S_{yon}=?$

Javob: 36π



KONUSGA ICHKI CHIZILGAN SHAR

61-masala
DTM 2019

61-masala: Radiusi $\frac{25}{4}$ bo'lgan sferaga balandligi 8 ga teng bo'lgan konus ichki chizlgan. Konusning hajmini toping.

Yechish:

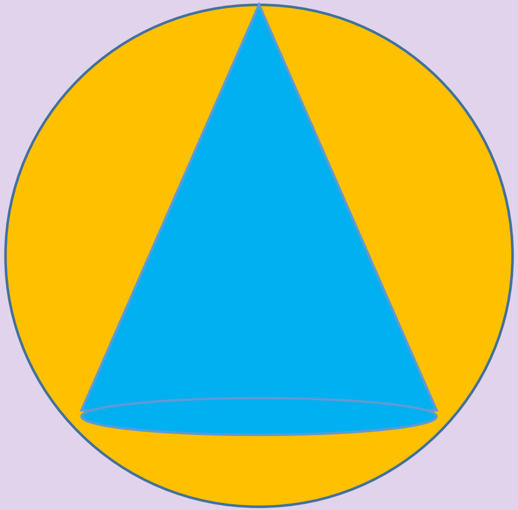
$R=\frac{25}{4}$

$$R^2 = r^2 + (8 - R^2)$$

r=6

$V_{konus} = \frac{1}{3}\pi r^2 H$

$V_{konus} = 96\pi$ *Javob: 96π*



KONUSGA ICHKI CHIZILGAN SFERA

51-masala
DTM 2019

51-masala (03-2-16): Konus asosining yuzi 9 π ga , yon sirtining yuzi 15 π ga teng. Shu konusga icki chizilgan sferaning radiusini toping.

Yechish:

$S_{asos} = \pi R^2 = 9\pi$

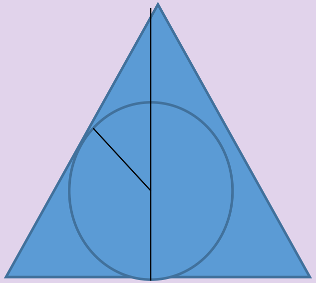
R=3

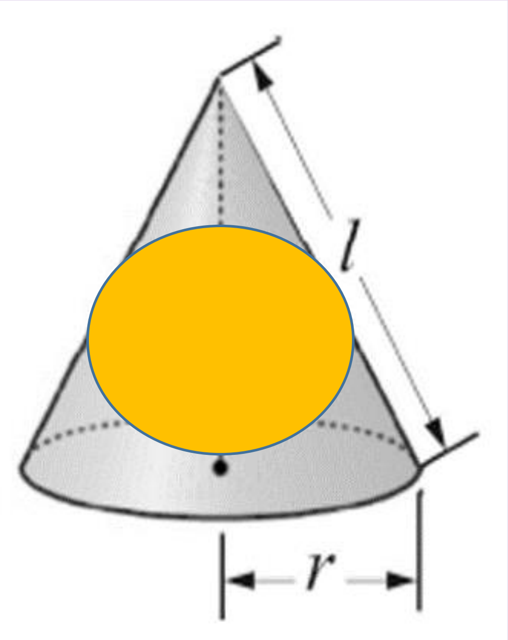
πRl=15π

L=5

$4 + R^2 = 16 - 82 + r^2$

r=1,5





Javob:1,5

MAVZUGA DOIR TESLARDAN NAMUNALAR

1. Hajmi 432 π ga teng bo'lgan silindrning o'q kesimi kvadratdan iborat. Silindrga ichki chizilgan shar sirtining yuzini toping.

A) 120 π B) 134 π C) 144 π D) 150 π E) 124 π

2. Teng yonli silindrga radiusi 3 ga teng shar ichki chizilgan. Silindr va shar sirtlari orasida joylashgan jismning hajmini toping.

A) 27 π B) 24 π C) 18 π D) 12 π E) 21 π

3. Radiusi 5 ga teng bo'lgan sharga ichki chizilgan konusning balandligi 4 ga teng. Konusning hajmini toping.

A) 28 π B) 18 π C) 24 π D) 32 π E) 16 π

4. Teng tomonli konusga shar tashqi chizilgan. Shar sirtining konusning to'la sirtiga nisbatini toping.

A) 9 : 4 B) 7 : 4 C) 16 : 9 D) 4 : 3 E) 9 : 5

5. Konusning balandligi 6 ga teng, yasovchisi 10 ga teng. Konusning ichki chizilgan sharning radiusini toping.

A) 3 B) 8/3 C) 4 D) $3\sqrt{3}$ E) $2\sqrt{2}$

6. Kesik konusga shar ichki chizilgan. Agar kesik konus asoslarining yuzlari π va 4π ga teng bo’lsa, shun konus yon sirtining yuzini toping.

A) 6π B) 7π C) 8π D) 9π E) 10π

7. Muntazam to’rtburchakli prizmaga silindr ichki chizilgan. Silindr hajmining prizma hajmiga nisbatini toping.

A) $\frac{\pi}{3}$ B) $\frac{\pi}{5}$ C) $\frac{\pi}{4}$ D) $\frac{2\pi}{3}$ E) $\frac{3\pi}{4}$

8. Shar ichiga joylashtirilgan to’g’ri silindrning balandligi asos radiusidan 2 marta kata bo’lsa, silindr hajmining shar hajmiga nisbatini toping.

A)3 B) 8/3 C) $3\sqrt{2}/8$ D) $3\sqrt{3}$ E) $2\sqrt{2}$

DARS YAKUNI

Geometriya fanini o‘rganishda shaklning alohida o‘rni bor. Shakl geometriya fanini amaliy va kundalik masalalarni hal qilishga tadbiq etish imkonini beradi. O‘quvchida masala yechishga ishtiyoqni oshirish uchun avvalo fazoviy tasavvurni rivojlantirish lozim. Fazoviy tasavvur — fazodagi ob’ektlarni ongimizda aslidagidek idrok etish jarayonida narsa va hodisa to’g’risidagi mantiqiy fikrlab xulosa qilingan bilimlar yig’indisi asosida aks ettirilgan obrazdir.

E’TIBORINGIZ UCHUN RAHMAT!