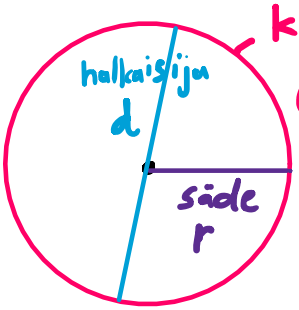


kehä (kehän pituus, piiri, p)

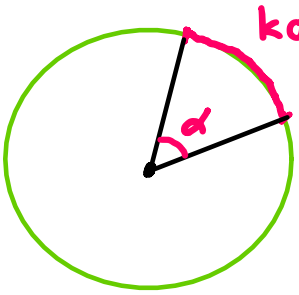
$d = 2r$

$\frac{p}{d} = \pi$ (piii)

π

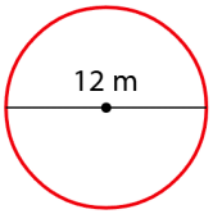
3,14159265358979323846

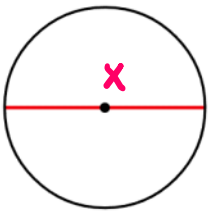
$p = \pi d = 2\pi r$

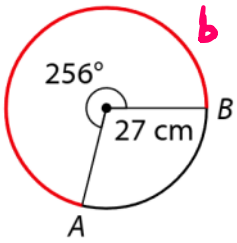


kaaren pituus $b = \frac{\alpha}{360°} \cdot \overbrace{2\pi r}^{p}$

8.1 Laske ympyrän
a) kehän pituus b) halkaisijan pituus c) kaaren AB pituus.







a) $p = \pi \cdot 12$ m

37,69911184307751886616

≈ 38 m

b) $\pi \cdot x = 155 \quad /:\pi$

$x = \frac{155}{\pi}$

$x = 49,338...$

$x \approx 49,3$ mm

c) $b = \frac{256°}{360°} \cdot 2\pi \cdot 27\text{cm}$

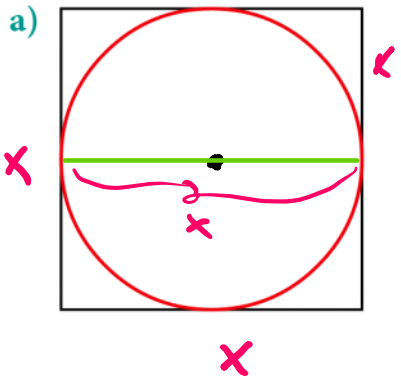
256 ÷ 360 × 2 × π × 27

120,637157897848060357

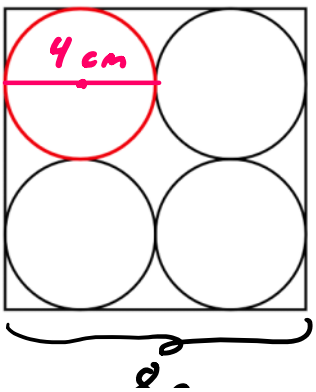
≈ 120 cm

8.5 Neliön piiri on 32,0 cm. Laske punaisen ympyrän kehän pituus.

a)



b)



x

$4x = 32 \quad /:4$

$x = 8$ cm

$p = \pi \cdot 8\text{ cm} = 25{,}13\ldots$

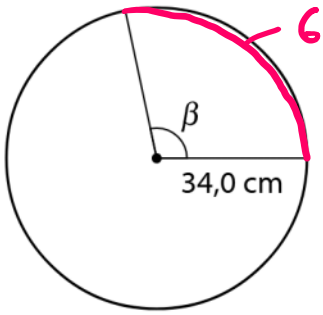
$\approx 25{,}1$ cm

8 cm

$p = \pi \cdot 4\text{ cm} = 12{,}56\ldots$

$\approx 12{,}6$ cm

8.10 Ratkaise kuvassa kulma β asteen tarkkuudella, kun kulmaa β vastaavan sektorin kaaren pituus on 60,5 cm.



60,5 cm

$\frac{\beta}{360°} \cdot 2\pi \cdot 34 = 60{,}5 \quad /: 2\pi \cdot 34$

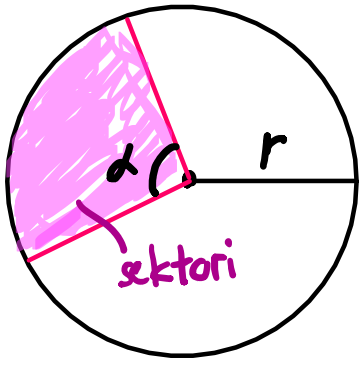
$\frac{\beta}{360°} = \frac{60{,}5}{2\pi \cdot 34}$

$\frac{\beta}{360°} =$ 60,5 ÷ (2 × π × 34) = 0,28320217814881375923 $\cdot 360°$

$\beta =$ 60,5 ÷ (2 × π × 34) × 360 = 101,95278413357295325

$\beta \approx 102°$

9 Pinta-ala



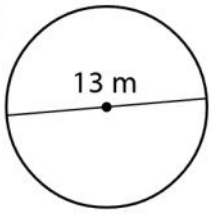
$A = \pi r^2$

$A_{sektori} = \frac{\alpha}{360°} \cdot \pi r^2$ (A)

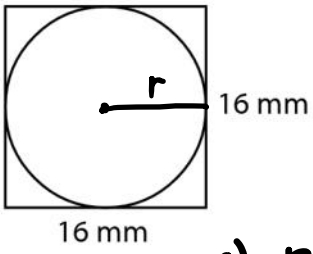
9.1 Laske ympyrän pinta-ala.

a)

b)



c)



a) $A = \pi \cdot (5{,}2\ \text{cm})^2$

π × 5,2 ^ 2

84,948665353068009168

$\approx 85\ \text{cm}^2$

b) $r = \frac{13\ \text{m}}{2} = 6{,}5\ \text{m}$

$A =$

π × 6,5 ^ 2

132,732289614168764325

$\approx 130\ \text{m}^2$

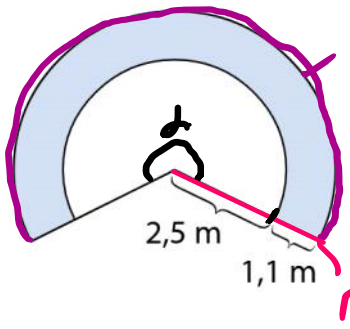
c) $r = \frac{16\ \text{mm}}{2} = 8\ \text{mm}$

$A = \pi \cdot (8\ \text{mm})^2$

$= 201{,}06\ldots$

$\approx 200\ \text{mm}^2$

9.12 Kuvan suuremman ympyräsektorin kaaren pituus on 15 m. Laske väritetyn alueen pinta-ala.



$\frac{\alpha}{360°} \cdot 2\pi \cdot 3{,}6 = 15$

$\frac{\alpha}{360°} \cdot 22{,}619\ldots = 15 \quad /: 22{,}619\ldots$

$\frac{\alpha}{360°} = 0{,}663\ldots \quad / \cdot 360°$

$\alpha = 238{,}73\ldots°$

$A_{\text{väritetty}} = A_{\text{iso sektori}} - A_{\text{pieni sektori}}$

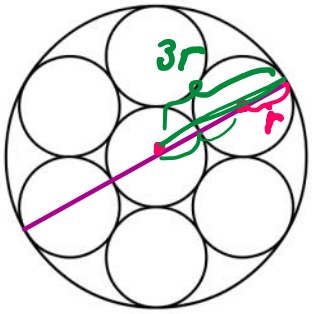
$= \frac{238{,}73\ldots°}{360°} \cdot \pi \cdot (3{,}6\ \text{m})^2 - \frac{238{,}73\ldots°}{360°} \cdot \pi \cdot (2{,}5\ \text{m})^2$

ANS ÷ 360 × π × 3,6 ^ 2 − ANS ÷ 360 × π × 2,5 ^ 2

= 13,979166666666666667

$\approx 14\ \text{m}^2$

9.24 Seitsemän samanlaista ympyrää on laitettu kuvan mukaisesti ison ympyrän sisälle. Kuinka monta prosenttia pikkuympyrät peittävät ison ympyrän pinta-alasta?



$A_{iso} = \pi \cdot (3r)^2 = \pi \cdot 9r^2$

$A_{pieni} = \pi \cdot r^2$

$$\frac{7 \cdot \pi \cdot r^2}{\pi \cdot 9r^2} = \frac{7}{9} = 0{,}777\ldots \approx 78\,\%$$