

RADIANS

Exercise 18 A

4.a. $r=7, \theta = 1.2$

$$S = \theta \cdot r = 1.2 \times 7 = 8.4 \text{ cm}$$

$$A = \frac{\theta}{2} \times r^2 = \frac{1.2}{2} \times 49 = 29.4 \text{ cm}^2$$

c. $s=12, r=8$

$$12 = r \times \theta$$

$$\theta = \frac{12}{8} = \frac{3}{2} = 1.5 \text{ rad}$$

$$A = \frac{1.5}{2} \times 64 = 48 \text{ cm}^2$$

e. $A=30, r=5$

$$30 = \frac{\theta}{2} \times 25$$

$$\theta = \frac{60}{25} = \frac{12}{5} = 2.4 \text{ rad}$$

$$S = 2.4 \times 5 = 12 \text{ cm}$$

g. $A=24, r=6$

$$24 = \frac{\theta}{2} \times 36$$

$$\theta = \frac{4}{3} \text{ rad}$$

h. $A=30, s=10$

$$30 = \frac{\theta}{2} \times r^2$$

$$10 = \theta \cdot r$$

$$30 = \frac{10}{2} \cdot r$$

$$r = 6 \text{ cm}$$

5.d. $r=6, s=9$

$$9 = \theta \cdot 6$$

$$\theta = \frac{9}{6} = \frac{3}{2} \text{ rad}$$

$$\text{Sector Area} = \frac{1.5}{2} \times 36 = 27 \text{ cm}^2$$

$$\text{Triangle Area} = \frac{1}{2} (6)^2 \sin 1.5 = 17.95 \text{ cm}^2$$

$$\text{Segment Area} = 27 - 17.95 = 9.045 \text{ cm}^2 = 9.05 \text{ cm}^2$$

e. $r=9.5 \text{ cm}, s=4 \text{ cm}$

$$A = \theta \times 9.5$$

$$\theta = \frac{4}{9.5} \text{ rad}$$

$$\text{Sector Area} = \frac{4}{9.5} \times 9.5^2 = 19 \text{ cm}^2$$

$$\text{Triangle Area} = \frac{1}{2} \times (9.5)^2 \sin\left(\frac{4}{9.5}\right) = 18.444 \text{ cm}^2$$

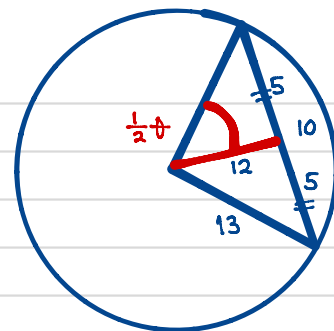
$$\text{Segment Area} = 19 - 18.444 = 0.56 \text{ cm}^2$$

6.

$$\sin \frac{1}{2}\theta = \frac{5}{13}$$

$$\frac{1}{2}\theta = 0.395 \text{ rad}$$

$$\theta = 0.79 \text{ rad}$$



$$\text{Segment Area} = \frac{0.79}{2} \times 13^2 = 66.72 \text{ cm}^2$$

$$\text{Triangle Area} = \frac{1}{2} \times 10 \times 12 = 60 \text{ cm}^2$$

$$\text{Segment Area} = 66.72 - 60 = 6.72 \text{ cm}^2$$

7.

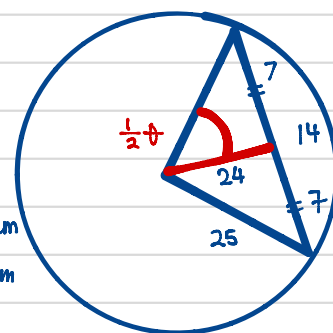
$$\sin \frac{1}{2}\theta = \frac{7}{25}$$

$$\frac{1}{2}\theta = 0.28 \text{ rad}$$

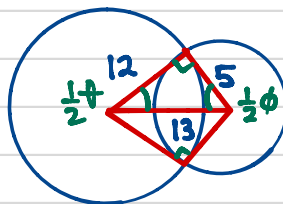
$$\theta = 0.57 \text{ rad}$$

$$S = \theta r = 0.57 \times 25 = 14.19 \text{ cm}$$

$$\text{Perimeter} = 14.19 + 14 = 28.19 \text{ cm}$$



9.



$$\sin \frac{1}{2}\phi = \frac{5}{13}$$

$$\frac{1}{2}\phi = 0.395 \text{ rad}$$

$$\phi = 0.79 \text{ rad}$$

$$\sin \frac{1}{2}\phi = \frac{12}{13}$$

$$\frac{1}{2}\phi = 1.176 \text{ rad}$$

$$\phi = 2.35 \text{ rad}$$

Sector Area 1:

$$= 0.79 \times 12^2 = 56.9 \text{ cm}^2$$

Sector Area 2:

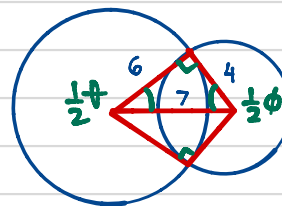
$$= \frac{2.35}{2} \times 5^2 = 29.4 \text{ cm}^2$$

$$\text{Kite Area} = 12 \times 5 = 60 \text{ cm}^2$$

Common Area =

$$56.9 + 29.4 - 60 = 26.3 \text{ cm}^2$$

10.



$$\sin \frac{1}{2}\theta = \frac{4}{7}$$

$$\frac{1}{2}\theta = 0.608 \text{ rad}$$

$$\theta = 1.216 \text{ rad}$$

$$\sin \frac{1}{2}\phi = \frac{6}{7}$$

$$\frac{1}{2}\phi = 1.03 \text{ rad}$$

$$\phi = 2.06 \text{ rad}$$

$$\text{Perimeter} = S_1 + S_2$$

$$= 1.216 \times 6 + 2.06 \times 4 = 15.54 \text{ cm}$$

$$\text{Sector Area} = 0.608 \times 36 + 1.03 \times 16 = 38.37 \text{ cm}^2$$

$$\text{Kite Area} = 6 \times 4 = 24$$

$$\text{Common Area} = 38.37 - 24 = 14.37 \text{ cm}^2$$