Take-Up Circle Word Problems from Circles 3 Handout

2). Paul goes for a short cycle ride. Each wheel on his bike has a radius of 27 cm. His distance counter tells him the wheel has rotated 650 times. Find how far he has travelled in metres.

\[ C = 2\pi r \]
\[ C = 2 \times 3.14 \times 27 \]
\[ C = 169.56 \text{ cm} \quad [\text{one rev}] \]

\[ \Rightarrow 650 \text{ rotations} \]
\[ = 650 \times 169.56 \]
\[ = 110214 \text{ cm} \]

\[ \Rightarrow \text{convert to m} \Rightarrow \div 100 \]
\[ = 1102.14 \text{ m} \]
2.5 Take-Up Circle Word Problems

4). The square and the circle have the same area.
   a. Find the radius of the circle.
   b. What is the circumference of the circle?

   \[ A = l \times w = 12 \times 12 = 144 \text{ cm}^2 = A_0 \]
   \[ A_0 = \pi r^2 \]
   \[ \frac{144}{3.14} = \frac{3.14 \times r^2}{3.14} \]
   \[ r^2 = 45.85977261 \]
   \[ r = \sqrt{45.85977261} = 6.77 \text{ cm} \]

   b) \[ C = 2\pi r \]
   \[ C = 2 \times 3.14 \times 6.77 \]
   \[ = 42.45 \text{ cm} \]

6). The diagram shows a running track. BA and DE are parallel and straight. They are 100 m long. BCD and EFA are semicircular. They each have a diameter of length 64 m.
   a. Calculate the perimeter of the track.
   b. Calculate the total area enclosed inside the track.

   a) Perimeter = distance around the track.
   \[ = \pi d + 100 + 100 \]
   \[ = 3.14 \times 64 + 100 + 100 \]
   \[ = 400.96 \text{ m} \]

   b) Area = space inside the track.
   \[ = 2 \text{ semi circles} + \text{ rectangle} \]
   \[ = \pi r^2 + l \times w \]
   \[ = 3.14 \times (\frac{64}{2})^2 + 100 \times 64 \]
   \[ = 3215.36 + 6400 \]
   \[ = 9615.36 \text{ m}^2 \]
7. a) A circle has a radius of 34 cm. Calculate its circumference.
   b) The diagram shows four touching circles. Each circle has a radius of 34 cm. P, Q, R and S are centres of the circles and PQRS is a square.

   i) What is the perimeter of the shaded region?
   ii) Calculate the area of the shaded region.

   a) \[ C = 2\pi r \]
   \[ = 2 \times 3.14 \times 34 \]
   \[ = 213.52 \text{ cm} \]

   b) Made from four quarter circles

   (i) Perimeter = \( 2\pi r \)
   \[ = 2 \times 3.14 \times 34 \]
   \[ = 213.52 \text{ cm} \]

   (ii) Area = Square - 4 quarter circles
   \[ = 68 \times 68 - 3.14 \times 34^2 \]
   \[ = 4624 - 3629.84 \]
   \[ = 994.16 \text{ cm}^2 \]