

Extra Practice for Section I: Chapter 1

1.
 - a. Convert $\frac{\pi}{10}$ radians into degrees.
 - b. Convert 10° degrees into radians.

[Click here to see the solution to 1.](#)

2. What is the arc-length spanned by an angle of 25° on a circle of radius 30 inches?

[Click here to see the solution to 2.](#)

Solution to 1.

- 1. a.** Convert $\frac{\pi}{10}$ radians into degrees.

Let's try this using two different methods:

- (1) One option is to use the fact that $\frac{180^\circ}{\pi \text{ rad}} = 1$ (since $180^\circ = \pi \text{ rad}$):

$$\begin{aligned} \frac{\pi}{10} \text{ rad} \cdot 1 &= \frac{\pi}{10} \cancel{\text{rad}} \cdot \frac{180^\circ}{\cancel{\pi} \cancel{\text{rad}}} \\ &= \frac{\cancel{\pi} \cdot 180^\circ}{10 \cdot \cancel{\pi}} \\ &= \frac{180^\circ}{10} \\ &= 18^\circ \end{aligned}$$

Thus, $\frac{\pi}{10} = 18^\circ$.

- (2) Another option is to recognize that, since $\pi \text{ rad} = 180^\circ$, $\frac{\pi}{10}$ is equivalent to

$\frac{180^\circ}{10} = 18^\circ$. Therefore, $\frac{\pi}{10} = 18^\circ$.

- b.** Convert 10° degrees into radians.

Let's try this using two different methods:

- (1) One option is to use the fact that $\frac{\pi \text{ rad}}{180^\circ} = 1$ (since $180^\circ = \pi \text{ rad}$):

$$\begin{aligned} 10^\circ \cdot 1 &= 10^\circ \cdot \frac{\pi \text{ rad}}{180^\circ} \\ &= \frac{10\pi}{180} \text{ rad} \\ &= \frac{\pi}{18} \text{ rad} \end{aligned}$$

Thus, $10^\circ = \frac{\pi}{18}$.

- (2) Another option is to recognize that, since $180^\circ = \pi \text{ rad}$, $\frac{180^\circ}{18} = 10^\circ$ is equivalent

to $\frac{\pi}{18}$. Therefore, $10^\circ = \frac{\pi}{18}$.

Solution to 2.

2. What is the arc-length spanned by an angle of 25° on a circle of radius 30 inches?

Before we can use the formula $s = r|\theta|$, we need to convert the angle 25° into radians:

$$\begin{aligned} 25^\circ \cdot \frac{2\pi \text{ rad}}{360^\circ} &= \frac{50\pi}{360} \text{ rad} \\ &= \frac{5\pi}{36} \text{ rad} \end{aligned}$$

Now we can find the desired arc-length:

$$\begin{aligned} s &= r|\theta| \\ &= 30 \cdot \frac{5\pi}{36} \\ &= \frac{25\pi}{6} \end{aligned}$$

Thus, the arc-length spanned by an angle of 25° on a circle of radius 30 inches is $\frac{25\pi}{6}$ inches.

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