Topic: Degrees, radians, and DMS

Question: Convert 220° to radians.

Answer choices:

A $\frac{9\pi}{11}$

B $\frac{5\pi}{4}$

C $\frac{11\pi}{9}$

D $\frac{5\pi}{6}$

Solution: C

Since there are π radians in $180°$, we'll convert $220°$ to radians by multiplying by $\pi/180°$.

$$220° \left(\frac{\pi}{180°} \right)$$

$$\frac{220\pi}{180}$$

$$\frac{11\pi}{9}$$

Topic: Degrees, radians, and DMS

Question: Convert $38.27°$ to DMS.

Answer choices:

A $38°0′0.27″$

B $38°16′12″$

C $38°0.27′0″$

D $38°12′16″$

Solution: B

When we convert the angle $38.27°$ in degrees to DMS, the integer part, 38, will be the degree part of the DMS angle. So the only thing we really need to do is convert the $0.27°$ to minutes and seconds.

If we think about $0.27°$ as $(27/100)°$, then we can convert it from degrees to minutes.

$$\left(\frac{27}{100}\right)^{\circ}\left(\frac{60'}{1^{\circ}}\right)$$

$$\left(\frac{27(60)}{100}\right)'$$

$$\left(\frac{1{,}620}{100}\right)'$$

$$16.2'$$

So the minutes portion of the DMS angle will be $16'$. Now we'll convert the $0.2'$ into seconds.

$$0.2'\left(\frac{60''}{1'}\right)$$

$$12''$$

So the angle $38.27°$ in degrees converts to the DMS angle $38°16'12''$.

Topic: Degrees, radians, and DMS

Question: Convert $55°36'18''$ to degrees.

Answer choices:

A $55.9°$

B $55.54°$

C $55.5°$

D $55.605°$

Solution: D

The $55°$ part of $55°36'18''$ is already in degrees, so we only need to convert the minutes and seconds portions of the DMS angle.

First, we convert seconds to minutes, then minutes to degrees, so we'll convert the seconds part first. We need to convert $18''$ from seconds to minutes. We know that $1' = 60''$, so we'll multiply $18''$ by $1'/60''$ in order to cancel the seconds and be left with just minutes.

$$18''\left(\frac{1'}{60''}\right)$$

$$\left(\frac{18}{60}\right)'$$

$$0.3'$$

Then the total minutes in $55°36'18''$ is

$$(36 + 0.3)'$$

$$36.3'$$

To convert this value for minutes into degrees, we'll multiply by $1°/60'$ in order to cancel the minutes and be left with an approximate value for degrees.

$$36.3'\left(\frac{1°}{60'}\right)$$

$$\left(\frac{36.3}{60}\right)°$$

$$0.605^\circ$$

Putting this together with the 55° from the original angle, we get approximately

$$(55 + 0.605)^\circ$$

$$55.605^\circ$$