4.6, #11: Solve the equation $A = P(1 + r)^t$ for t (note: this is used in finance).

4.6, #13: Solve the equation $\ln\left(\frac{k}{A}\right) = \frac{-E}{RT}$ for k (note: this is used in chemistry).

4.6, #15: Suppose that \$12,000 is invested in a bond fund and the account grows to \$14,309.26 in 4 years.
(a). Use the model $A = Pe^{rt}$ to determine the average rate of return under continuous compounding. Round to the nearest tenth of a percent.

(b). How long will it take the investment to reach \$20,000 if the rate of return continues? Round to the nearest tenth of a year.

4.6, #25: The isotope of plutonium ^{238}Pu is used to make thermoelectric power sources for spacecraft. Suppose that a space probe was launched in 2012 with 2.0 kg of ^{238}Pu.
(a). If the half-life of ^{238}Pu is 87.7 years, write a function of the form $Q(t) = Q_0e^{kt}$ to model the quantity $Q(t)$ of ^{238}Pu left after t years.

(b). If 1.6 kg of ^{238}Pu is required to power the spacecraft's data transmitter, for how long after launch would scientists be able to receive data? Round to the nearest year.

4.6, #21: A function of the form $P(t) = ab^t$ represents the population (in millions) of the given country t years after January 1, 2000.

(a). In each row of the table below, write an equivalent function using base e; that is, write a function of the form $P(t) = P_0e^{kt}$. Also, determine the population of each country for the year 2000.

Country	$P(t) = ab^t$	$P(t) = P_0e^{kt}$	Population in 2000
Costa Rica	$P(t) = 4.3(1.0135)^t$		
Norway	$P(t) = 4.6(1.0062)^t$		

(b). The population of the two given countries is very close for the year 2000, but their growth rates are different. Use the model to approximate the year during which the population of each country reached 5 million.

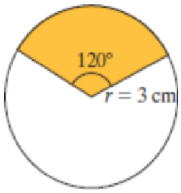
(c). Costa Rica had fewer people in the year 2000 than Norway. Why would Costa Rica reach a population of 5 million sooner than Norway?

5.1, #51: Convert $-\frac{2\pi}{5}$ radians to degrees, then find an angle between 0 and 2π that is coterminal with it.

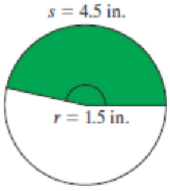
5.1, #59: Consider the angle $\theta = -465°$. Find a positive and negative angle coterminal with it. Give one that is in radians and between 0 and 2π.

5.1 #105: Convert the angle $18°13'37''$ to degree decimal form. Then, find the complement and supplement of it, in the original notation.

5.1 #97: Compute the area of the sector and the length of the arc intercepted by the central angle on the circle below.



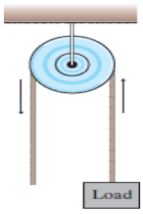
5.1 #119: Compute the area of the sector shaded below.



5.1 #123: If an angle of a sector is held constant but the radius is doubled, how will the arc length and area of the sector be affected?

5.1, #81: Raleigh, North Carolina (35.8°N, 78.6°W), is located north of the equator, and Quito, Ecuador (0.3°S, 78.6°W), is located south of the equator. The longitudes are the same indicating that the cities are due north-south of each other. Use the difference in latitude to approximate the distance between the cities.

5.1, #83: A pulley is 16 cm in diameter.

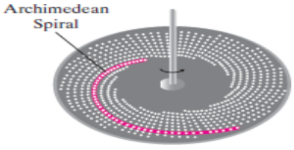


(a). Find the distance the load will rise if the pulley is rotated 1350°. Find the exact distance in terms of π and then round to the nearest centimeter.

(b). Through how many degrees should the pulley rotate to lift the load 100 cm? Round to the nearest degree.

5.1, #115: A spinning-disc confocal microscope contains a rotating disk with multiple small holes arranged in a series of nested Archimedean spirals. An intense beam of light is projected through the holes, enabling biomedical researchers to obtain detailed video images of live cells. The spinning disk has a diameter of 55 mm and rotates at a rate of 1800 rpm. At the edge of the disk,

(a). Find the angular speed.



(b). Find the linear speed. Round to the nearest whole unit.