

Practise, Apply, Solve 5.7, page 463

For questions 1–4, plot the points from the table. The axis of symmetry is at $y = 0$.

- min. $(-90^\circ, -3)$ and $(270^\circ, -3)$, max. $(90^\circ, 3)$, zeros $-180^\circ, 0^\circ, 180^\circ$, and 360° ; $y = 3 \sin \theta$
 - min. $(\frac{\pi}{2}, -2)$, max. $(\frac{-\pi}{2}, 2)$, $(\frac{3\pi}{2}, 2)$, zeros $-\pi, 0, \pi, 2\pi$;
 $y = -2 \sin \theta$
- min. $(90^\circ, -1)$ and $(90^\circ, -1)$, max. $(0^\circ, 1)$ and $(180^\circ, 1)$, zeros $-45^\circ, 45^\circ, 135^\circ$; $y = \cos 2\theta$
 - min. $(-2\pi, -1)$ and $(2\pi, -1)$, max. $(0, 1)$ and $(4\pi, 1)$, zeros $-\pi, \pi, 3\pi$; $y = \cos \frac{\theta}{2}$
- min. $(300^\circ, -1)$, max. $(120^\circ, 1)$, zeros $30^\circ, 210^\circ, 390^\circ$;
 $y = \sin(\theta - 30^\circ)$
 - min. $(225^\circ, -1)$, max. $(45^\circ, 1)$, zeros $-45^\circ, 135^\circ$, and 315° ;
 $y = \sin(\theta + 45^\circ)$
- min. $(\frac{4\pi}{3}, -1)$, max. $(\frac{\pi}{3}, 1)$, $(\frac{7\pi}{3}, 1)$, zeros $\frac{5\pi}{6}, \frac{11\pi}{6}$;
 $y = \cos(\theta - \frac{\pi}{3})$
 - min. $(\frac{5\pi}{6}, -1)$, max. $(\frac{-\pi}{6}, 1)$ and $(\frac{11\pi}{6}, 1)$, zeros $\frac{\pi}{3}, \frac{4\pi}{3}$;
 $y = \cos(\theta + \frac{\pi}{6})$
- $y = \sin 2(\theta + 30^\circ)$
- $y = 5$
- $y = -9$
- $y = 2 \sin 2(\theta + 45^\circ)$
 - $y = 3 \sin 2\theta + 2$
 - $y = 2.5 \sin \frac{1}{2}(\theta - 180^\circ) + 2.5$
 - $y = 2 \sin 2(\theta + 90^\circ) + 4$
 - $y = 3 \sin 4(\theta - 22.5^\circ) - 2$
- $y = 2 \cos 2\theta$
 - $y = 3 \cos 2(\theta - 45^\circ) + 2$
 - $y = -2.5 \cos \frac{\theta}{2} + 2.5$
 - $y = 2 \cos 2(\theta + 45^\circ) + 4$
 - $y = -3 \cos 4\theta - 2$
- $y = 3 \sin(\theta - \frac{\pi}{4}) - 1$
 - $y = \frac{1}{2} \sin 2(\theta + \frac{\pi}{3}) + 2$
 - $y = 2 \sin 4(\theta - \frac{\pi}{6}) + 3$
 - $y = -2 \sin \frac{1}{2}(\theta - \frac{\pi}{8}) - 3$
 - $y = \frac{-3}{4} \sin \frac{2}{3}(\theta - \frac{\pi}{2}) - 2$
- $y = \sin k\theta$ has the same graph as $y = \cos k(\theta - \frac{\pi}{2k})$.
- $y = 3 \cos(\theta - \frac{3\pi}{4}) - 1$
 - $y = \frac{1}{2} \cos 2(\theta + \frac{\pi}{12}) + 2$
 - $y = 2 \cos 4(\theta - \frac{7\pi}{24}) + 3$
 - $y = -2 \cos \frac{1}{2}(\theta - \frac{9\pi}{8}) - 3$
 - $y = \frac{-3}{4} \cos \frac{2}{3}(\theta - \frac{5\pi}{4}) - 2$
- $d(t) = 55 \cos \frac{\pi}{30}(t - 5)$ or $d(t) = 55 \sin \frac{\pi}{30}(t + 10)$
- Plot the points given. Let x -axis represent time and y -axis represent elevation.
 - sinusoidal model
 - $e(t) = 19.91 \cos \frac{\pi}{12}(t - 2) + 23.04$
 - This equation cannot be used to evaluate the present day elevation of the sun because its domain is $0 \leq t \leq 24$.
 - between 6 A.M. and 7 A.M. and between 10 P.M. and 11 P.M.
- Plot the points given. Let x -axis represent month and y -axis represent temperature.
 - sinusoidal model
 - $T(t) = -17.8 \cos \frac{\pi}{6}t - 0.8$
 - -16.22°C
- Plot the points given. Let x -axis represent time and y -axis represent depth; $D(t) = -6 \cos \frac{\pi}{6}t + 11.5$
 - 7.3 m
 - 1:24 A.M., 10:36 A.M., 1:24 P.M., and 10:36 P.M.
- The respiratory cycle is an example of a periodic function because we inhale, rest, exhale, rest, inhale, and so on, in a cyclical pattern.
 - Plot the points given. Let x -axis represent time and y -axis represent velocity.
 - The equation is almost an exact fit on the scatter plot.
 - 0 L/s
 - $t = 0.6$ s and 2.4 s
- Plot the points for each city, as given, on the same grid. Let x -axis represent time in months and y -axis represent temperature; Athens: $T(t) = -10.5 \cos \frac{\pi}{6}t + 22.5$, Lisbon: $T(t) = -7 \cos \frac{\pi}{6}t + 20$, Moscow: $T(t) = -16 \cos \frac{\pi}{6}t + 7$
- $h(t) = -16.5 \cos \frac{\pi}{60}t + 18.5$
 - 30.2 m
 - 1 min, 3 min
- $a = \frac{\text{maximum} - \text{minimum}}{2}$
 - period = $\frac{2\pi}{k}$ or = $\frac{360^\circ}{k}$
 - Determine the horizontal distance the typical starting point for the graph is from the vertical axis. If to the right, $b < 0$; if to the left, $b > 0$.
 - $d = \frac{\text{maximum} + \text{minimum}}{2}$
- $H(d) = -25 \cos \frac{1}{25}d + 25$
 - 34.19 cm
 - 450 cm
 - The driver moves in a continuous way meaning no spinning of the tires or skidding to a stop.