The key to creating equations:

$$f(x) = a\sin\left(k(x-d)\right) + c$$

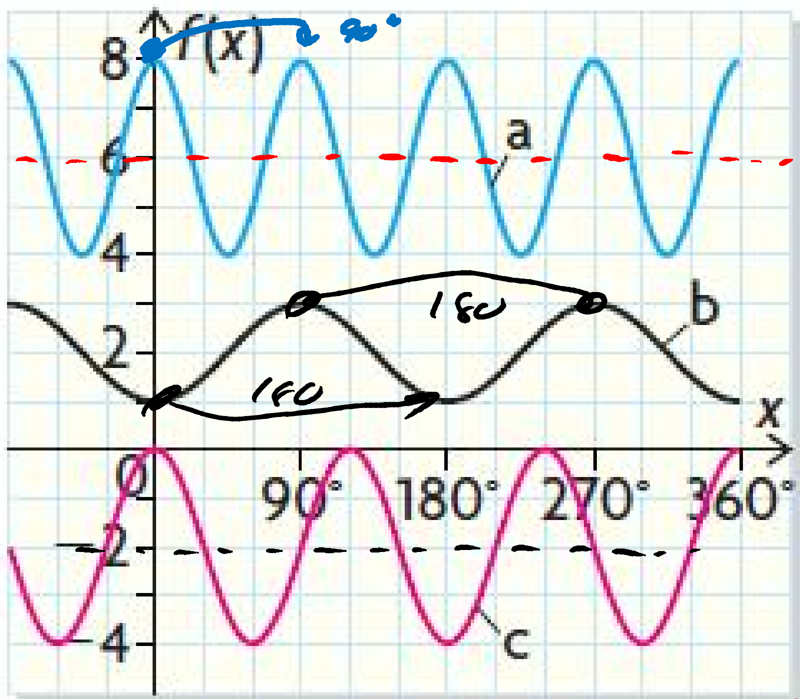
Amplitude = a, found by *peak-EoA*

Period = $\frac{360°}{k}$ therefore $k = \frac{360}{Period}$

Phase Shift = d – this is your "starting point" – must be peak, EoA or trough

Equation of Axis = c, found by $\frac{peak+trough}{2}$

	Starting at…
+sin	Equation of axis, then heads to peak
-sin	Equation of axis, then heads to trough
+cos	Peak
-cos	Trough



a) Peak = 8 Trough: 4

$\therefore$ EoA: $\frac{8+4}{2} = 6 \rightarrow \underline{c}$

Amplitude: $8 - 6 = 2$ $\underline{a}$

Period: $90°$ $\therefore \underline{k} = \frac{360}{90} = 4$

Because Peak is on y-axis, use cosine with $d=0$

$f(x) = 2\cos(4x) + 6$ or

$f(x) = 2\cos(4(x-180)) + 6$

b) Peak = 3 Trough = 1

$\therefore$ EoA = $\frac{3+1}{2} = 2$ c

Amplitude: $3 - 2 = 1$ a

Period: 180 $\therefore \underline{k} = \frac{360}{180} = 2$

$f(x) = -1\cos(2x) + 2$

or $f(x) = 1\cos(2(x-90)) + 2$

c) Peak = 0, Trough = −4 $\therefore$ EoA = −2

Amplitude: 2

Period: 120 $\therefore k = \frac{360}{120} = 3$

$f(x) = 2\sin(3(x-90)) - 2$

x	0°	45°	90°	135°	180°	225°	270°
y	9	7	5	7	9	7	5

Peak Peak

Peak: 9

Trough: 5

EoA: 7 c

Amp: 2 a

Period: 180°

$k = \frac{360}{180} = 2$ K

$f(x) = 2\cos(2x) + 7$

$f(x) = -2\sin(2(x - 225)) + 7$

A sinusoidal function has an amplitude of 4 units, a period of 120°, and a maximum at (0,9). Determine the equation of the function.

$d = 0$

Amp = 4 a

Period: 120 $\therefore$ k $= \frac{360}{120} = 3$

Peak = 9

EoA = 9 - 4 = 5 c

$\therefore f(x) = 4\cos(3x) + 5$

pg 391 # 4,5,6,7,8,11
pg 398 # 1,2,3,5,6

A group of students is tracking a friend, John, who is riding a Ferris wheel. They know that John reaches a maximum height of 11m at 10s and then reaches a minimum height of 1m at 55s. How high is John after 2 minutes?