Exam Review: Graphing Sinusoidal Functions

1. $y = 4\sin(2\theta - 8) + 3$
   $y = 4\sin[2(\theta - 4)] + 3$

   Amplitude = 4
   Period $= \frac{360°}{k} = \frac{360°}{2} = 180°$
   Phase = 4 (right)
   Vertical Displacement = 3 (up)

2a) $y = 2\sin(2\theta - 180°) + 1$
$y = 2\sin[2(\theta - 90°)] + 1$

$k = 2$
$d = 90°$
$a = 2$
$c = 1$

θ	$y = \sin\theta$
0°	0
90°	1
180°	0
270°	−1
360°	0

See graph on last page.
Domain: $\theta \in \mathbb{R}$
Range: $-1 \leq y \leq 3,\ y \in \mathbb{R}$

b) $y = 3\cos(-3\theta + 90°) - 1$
$y = 3\cos[-3(\theta - 30°)] - 1$

$k = -3$
$d = 30°$
$a = 3$
$c = -1$

θ	$y = \cos\theta$
0°	1
90°	0
180°	−1
270°	0
360°	1

See graph on last page.
Domain: $\theta \in \mathbb{R}$
Range: $-4 \leq y \leq 2,\ y \in \mathbb{R}$

Many possible answers here.

3.a) $k = \frac{360°}{T} = \frac{360°}{240°} = 1.5$

$d = 0°$
$a = 2$
$c = 1$
$y = a\sin[k(\theta - d)] + c$
$y = 2\sin[1.5\theta] + 1$

or other option

$y = 2\cos[1.5(\theta - 60°)] + 1$

b) $k = \frac{360°}{T} = \frac{360°}{120°} = 3$

$d = 30°$
$a = 1.5$
$c = -2$
$y = a\sin[k(\theta - d)] + c$
$y = 1.5\sin[3(\theta - 30°)] - 2$

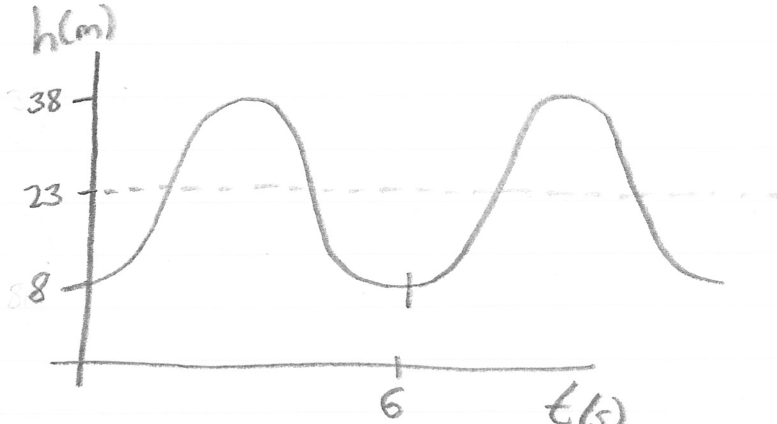
or

$y = 1.5\cos[3(\theta - 60°)] - 2$

or

$y = -1.5\cos[3\theta] - 2$

4.



$k = \frac{360°}{T} = \frac{360°}{6} = 60°$

$d = 0°$ ← if I use $y = -\cos\theta$ sinusoidal

$a = \frac{38-8}{2} = \frac{30}{2} = 15m$

$c = \frac{38+8}{2} = \frac{46}{2} = 23m$

There are other options here.

$y = a\cos[k(\theta - d)] + c$

$h = -15\cos[60°(t)] + 23$

set $t = 10$ seconds

$h = -15\cos(60(10)) + 23$

$= 7.5 + 23$

$= 30.5m$

2. Graph the following sinusoidals and define the domain and range.

a) y = 2 sin(2θ - 180) + 1 **b) y = 3 cos(-3θ + 90) – 1**