Exercise 10 A

2a $2 + \sin x$

max = 3, $x = 90°$

min = 1, $x = 270°$

b $7 - 4\cos x$

max = $7 + 4 = 11$, $x = 180°$

min = $7 - 4 = 3$, $x = \cancel{0}, 360°$

c. $5 + \cos 2x$

max = 6, at $2x = 0, 360$

$x = \cancel{0}, 180°$

min = 4, at $2x = 180°$

$x = 90°$

d $\frac{8}{3 - \sin x}$

max = 4, when $\sin x = 1$, $x = 90$

min = 2, when $\sin x = -1$, $x = 270$

e $g + \sin(4x - 20)$

max = 10, when $\sin(4x - 20) = 1$

$4x - 20 = 90$

$4x = 110$, $x = 27.5$

min = 8, when $\sin(4x - 20) = -1$

$4x - 20 = 270$

$4x = 290$, $x = 72.5$

f $\frac{30}{11 - 5\cos(\frac{1}{2}x - 45)}$

max = 5, when $\cos(\frac{1}{2}x - 45) = 1$

$\frac{1}{2}x - 45 = 0$

$\frac{1}{2}x = 45$, $x = 90$

min = $\frac{30}{16} = \frac{15}{8}$, when $\cos(\frac{1}{2}x - 45) = -1$

$\frac{1}{2}x - 45 = 180$

$\frac{1}{2}x = 225$, $x = 450$

3a. $\sin 20° = \sin 160°$

b. $\cos 40° = \cos 320°$

c. $\tan 60° = \tan 240°$

3.d $\sin 130 = \sin 50$

e $\cos 140 = 220$

f. $\tan 160 = \tan 340$

g. $\sin 400° = \sin 40° = \sin 140°$

h. $\cos(-30)° = \cos 330° = \cos 30°$

i. $\tan 430° = \tan 70° = \tan 250°$

j $\sin(-260) = \sin 100 = \sin 80$

k $\cos(-200) = \cos 160 = \cos 200$

l $\tan 1000 = \tan 280 = \tan 100$

4a. $\sin 20° = \sin 160°$

b. $\cos 40° = \cos(-40)°$

c. $\tan 60° = \tan(-120)°$

4 d $\sin 130 = \sin 50$

e $\cos 140 = \cos(-140)°$

f $\tan 160 = \tan(-20)$

g. $\sin 400° = \sin 40° = \sin 140°$

h. $\cos(-30)° = \cos 30°$

i. $\tan 430° = \tan 70° = \tan(-110)°$

j. $\sin(-260) = \sin 100 = \sin 80$

k $\cos(-200) = \cos 160 = \cos(-160)$

l. $\tan 1000 = \tan 280 = \tan(-80)$

$= \tan 100$

5a. $\frac{1}{2}\sqrt{2}$

b $\cos 120 = -\cos 60 = -\frac{1}{2}$

c. $\sin(-30) = -\sin 30 = -\frac{1}{2}$

d $\tan 240 = \tan 60 = \sqrt{3}$

e $\cos 225 = -\cos 45 = -\frac{1}{2}\sqrt{2}$

f. $\tan(-330) = \tan 30 = \frac{1}{3}\sqrt{3}$

g $\cos 900 = \cos 180 = -1$

h. $\tan 510 = \tan 150 = -\tan 30 = -\frac{1}{3}\sqrt{3}$

i. $\sin 225 = -\sin 45 = -\frac{1}{2}\sqrt{2}$

j $\cos 630 = \cos 270 = 0$

k. $\tan 405 = \tan 45 = 1$

l $\sin(-315) = \sin 45 = \frac{1}{2}\sqrt{2}$

m $\sin 210 = -\sin 30 = -\frac{1}{2}$

n $\tan 675 = \tan 315 = -\tan 45 = -1$

o $\cos(-120) = \cos 120 = -\frac{1}{2}$

p $\sin 1260 = \sin 180 = 0$

6 a $\theta = 60$

b $\varphi = 240$

c. $\theta = 120$

d $\theta = 30$

e. $\theta = 30$

f. $\varphi = 135$

g. $\theta = 210$

h $\theta = 90$

7a $\theta = 120$

b $\varphi = 60$

c. $\theta = |-90|$

d $\theta = 180$

e. $\varphi = 60$

f. $\theta = |-30|$

g $\varphi = |-45|$

h. $\theta = 0$

8 $D = A + B \sin 30t$

start at 8.am

max $D = 7.80$ m

min $D = 2.20$ m

$7.80 = A + B$

$2.20 = A - B$ −

$5.60 = 2B$

$B = 2.80$

$A = 7.80 - 2.80 = 5$

$D = 5 + 2.80 \sin 30t$

at noon $12.00 - 8.00 = 4$ h

$D = 5 + 2.80 \sin 120$

$= 5 + 2.80\left(\frac{1}{2}\sqrt{3}\right) = 7.42487$ m

≈ 742 cm