Trig. graphs + equations Solutions

E) $h = 15\tan x^\circ + 1.7$

(a) $P = 25^\circ$

$\Rightarrow h = 15\tan 25^\circ + 1.7$

$\underline{h = 8.7\text{m}}$

(b) $18.4 = 15\tan x^\circ + 1.7$

$-1.7 \quad -1.7$

$15\tan x^\circ = 16.7$

$\div 15 \quad \div 15$

$\tan x^\circ = 1.7$

$x = \tan^{-1} 1.7$

$x = 59.5^\circ$

$180^\circ + 59.5^\circ \neq 239.5^\circ$

S	A ✓
✓ T	C

x would have to be 59.5° as it is acute.

A)

S ×	A ✓
T × ✓	C ✓

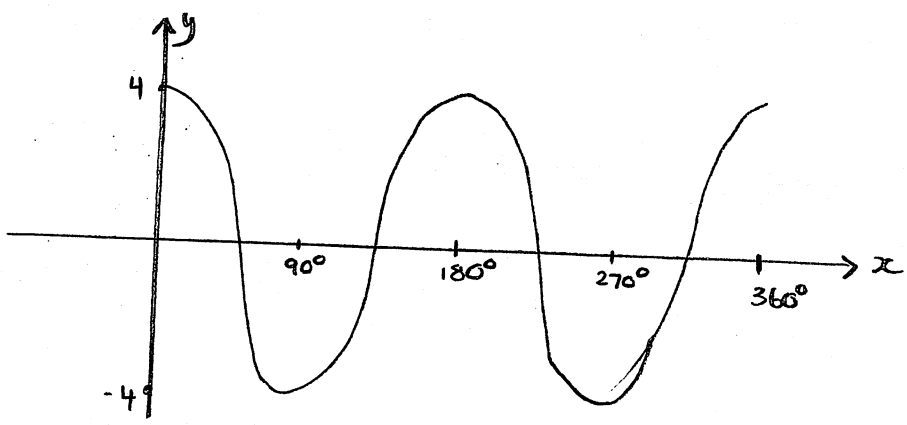
a could be 315° because $\sin 315^\circ < 0$

$\cos 315^\circ > 0$

$\tan 315^\circ < 0$

and $0^\circ < 315^\circ < 360^\circ$

B) $y = 4\cos 2x^\circ$



C) $\dfrac{\cos^3 x^\circ}{1 - \sin^2 x^\circ} = \dfrac{\cos^3 x}{\cos^2 x} \quad \begin{matrix} \div \cos^2 x \\ \div \cos^2 x \end{matrix} = \dfrac{\cos x}{1} = \cos x$

D) $2\tan x^\circ - 3 = 5$

$+3 \quad +5$

$2\tan x^\circ = 8$

$\div 2 \quad \div 2$

$\tan x^\circ = 4$

$x = \tan^{-1} 4$

$x = 76^\circ$

S	A ✓ +
+ T ✓	C

$x = 180^\circ + 76^\circ = 256^\circ$

Q12. $H = 10 + 5\sin t°$

(a) $H = 10 + 5\sin 10$

$H = 10.87m$

(b) $12.5 = 10 + 5\sin t°$

$-10 \quad -10$

$2.5 = 5\sin t°$

$\div 5 \quad \div 5$

$0.5 = \sin t°$

$t = \sin^{-1} 0.5$

$t = 30°$

$t = 180° - 30° = 150°$

S ✓	A ✓
T	C

After 30seconds and after 150seconds ($2\frac{1}{2}$ minuks)

Q12. (a) $2\tan x° + 7 = 0$

$-7 \quad -7$

$2\tan x° = -7$

$\div 2 \quad \div 2$

$\tan x = -3.5$

$x = \tan^{-1} 3.5$

$x = 74°$ (ref.)

- ✓ S	A
T	C ✓

$x = 180° - 74° = 106°$

$x = 360° - 74° = 286°$

(b) $\sin^3 x° + \sin^2 x° \cos^2 x° = \sin x°$ (LHS = RHS)

LHS

$\sin^3 x + \sin^2 x (1 - \sin^2 x)$

$\sin^3 x + \sin^2 x - \sin^3 x$

$= \sin^2 x = RHS$

Q10. $7\sin x - 3 = 0$

$+3 \quad +3$

$7\sin x = 3$

$\div 7 \quad \div 7$

$\sin x = \frac{3}{7}$

✓ S	A ✓
T	C

$x = \sin^{-1}\left(\frac{3}{7}\right)$

$x = 25.4°$

$x = 180° - 25.4° = 154.6°$

Q6. $\tan 45° = 1$

S	A
T	C

$\tan 135° = -1$

because $\tan 135° = \tan(180° - 45°)$

2002-2009

Q11. (a) $7\cos x° - 5 = 0$

$+5 \quad +5$

$7\cos x = 5$

$\div 7 \quad \div 7$

$\cos x° = \left(\frac{5}{7}\right)$

$x = \cos^{-1}\left(\frac{5}{7}\right)$

$x = 44.4°$

$x = 360° - 44.4° = 315.6°$

S ✓	A ✓
T	C ✓

(b) $\tan x° \cos x°$

$\tan x° = \frac{\sin x°}{\cos x°}$

$\cos x \cdot \frac{\sin x}{\cos x}$

$= \frac{\cos x \sin x}{\cos x}$

$= \sin x°$

Q6. $\sin 0° = 0$

$\sin 30° > 0$

$\sin 200° < 0$

$\sin 200°, \sin 0°, \sin 30°$

✓+ S	A ✓ +
T	C

Q12. $h = 8 + 4\sin t°$

(a) $h = 8 + 4\sin 30°$

$h = 10$ metres

(b) $10.5 = 8 + 4\sin t°$

$4\sin t° = 2.5$

$\sin t° = 0.625$

$t° = \sin^{-1}(0.625)$

$t = 38.7°$

$t = 180° - 38.7° = 141.3°$

After 38.7 seconds and 141.3 seconds

✓ S	A ✓
T	C

2007 P1

Q8. $\cos 60° = 0.5$

$\cos 240°$

$\Rightarrow \cos(180° + 60°) = -0.5$

S	A
✓ T	C

Q 2007 P2

$5\tan x° - 6 = 2$

$+6 \quad +6$

$5\tan x° = 8$

$\tan x = 1.6$

$x = \tan^{-1} 1.6$

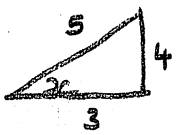
$x = 58°$

$x = 180° + 58° = 138°$

S	A ✓
✓ T	C

2008 P1

Q10. $\sin x^\circ = \frac{4}{5}$ $\cos x^\circ = \frac{3}{5}$



$\tan x^\circ = \frac{o}{a} = \frac{4}{3}$

2008 P2

Q8. $4\cos x^\circ + 3 = 0$
$-3 \quad -3$

$\frac{4\cos x^\circ}{4} = \frac{-3}{4}$

$\cos x = -0.75$

$x = \cos^{-1} 0.75$

$x = 41.4^\circ$ (ref.)

$x = 180^\circ - 41.4^\circ = 138.6^\circ$

$x = 180^\circ + 41.4^\circ = 221.4^\circ$