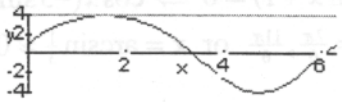
(a) $\cos x = \frac{1}{2} \Rightarrow \cos x = \pm\frac{1}{2} \Rightarrow x = \frac{\pi}{4} + k\frac{\pi}{2}$, $k \in \mathbf{Z}$,

(b) $\cos x(\cos x - 0.2) = 0 \Rightarrow \cos x = 0$ *or* $0.2 \Rightarrow x = \frac{\pi}{2} + k\pi$ *or*
$x = \cos^{-1}(0.2) + k2\pi \approx 1.369 + 2k\pi$ *or* $x = 2k\pi - \cos^{-1}(0.2) \approx -1.369 + 2k\pi$.
(If we canceled we would not find the solutions to $\cos x = 0$.)

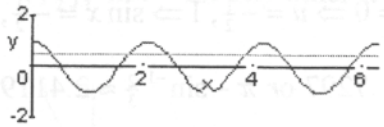
(c) $(1 - \cos^2 x) = 3\cos x + 1 \Rightarrow \cos x(\cos x + 3) = 0 \Rightarrow$
$\cos x = 0$ *or* $\cos x = -3$ (*impossible*) $\Rightarrow x = \frac{\pi}{2} + k\pi$, $k \in \mathbf{Z}$

$\cos(x^2) = 0 \Rightarrow x^2 = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \cdots \Rightarrow x = \pm\sqrt{\frac{\pi}{2}}, \pm\sqrt{\frac{3\pi}{2}}, \pm\sqrt{\frac{5\pi}{2}}$ (others outside interval)

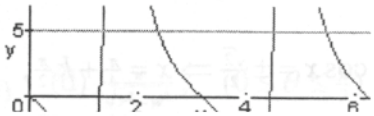
$(1 - \sin^2 x) + 4\sin x = 4$
$\Rightarrow u^2 - 4u + 3 = 0 \Rightarrow (u-1)(u-3) = 0$
$\Rightarrow u = 1$ *or* $3 \Rightarrow \sin x = 1$ *or* $3 \Rightarrow x = \frac{\pi}{2}$



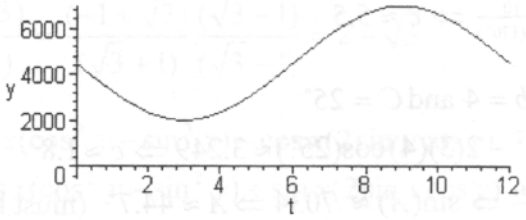
$\cos(3x) = 0.5 \Rightarrow 3x = \frac{\pi}{3}, \frac{5\pi}{3} + k2\pi$
$\Rightarrow x = \frac{\pi}{9}, \frac{5\pi}{9}, + k\frac{2}{3}\pi$
$\Rightarrow x = \frac{\pi}{9}, \frac{5\pi}{9}, \frac{7\pi}{9}, \frac{11\pi}{9}, \frac{13\pi}{9}, \frac{17\pi}{9}$



. $u^2 - 4u - 5 = 0 \Rightarrow u = -1, 5$
$\Rightarrow \tan t = -1 \Rightarrow t = \frac{3\pi}{4}, \frac{7\pi}{4}$. Also
$\tan t = 5 \Rightarrow t = \arctan 5, \arctan 5 + \pi$



2.(a) balance value = 4500, $A = 2500$,
$B = \frac{\pi}{6}$, $y = -2500\sin(\frac{\pi}{6}t) + 4500$



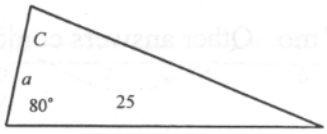
(b) y(3)=2000

(c) $3000 = -2500\sin(\frac{\pi}{6}t_*) + 4500$
$\Rightarrow \frac{-1500}{-2500} = \sin(\frac{\pi}{6}t_*) \Rightarrow \frac{\pi}{6}t_* = \sin^{-1}(\frac{3}{5}) \Rightarrow t_* = \frac{6}{\pi}\sin^{-1}(\frac{3}{5}) \approx 1.23$ mo.

(d) $t = 6 - t_* \approx 4.77$ mo. Other answers come by adding multiples of 12 to t_* *or* $6 - t_*$.

.5 Applying Trigonometry to a General Triangle: The Law of Cosines and the Law of Sines

. $C = 180° - 80° - 30° = 70°$
$\frac{a}{\sin(30°)} = \frac{25}{\sin(70°)} \Rightarrow a \approx 13.3$ *ft*



. $40^2 = 20^2 + 30^2 - 2(20)(30)\cos(D) \Rightarrow \cos(D) = \frac{300}{-1200} \Rightarrow D \approx 104.5°$