Project 1

① my bday = 12/08/2000

② $V_1 = \langle 8, -12, 2000-2000 \rangle \rightarrow = \langle 8, -12, 0 \rangle$

③ $V_2 = \langle 12, 2000-1940, -8 \rangle \rightarrow = \langle 12, 10, -8 \rangle$

④ $\|V_1\| = \sqrt{8^2+12^2+0^2} = \sqrt{64+144} = \sqrt{208}$

$\|V_2\| = \sqrt{12^2+10^2+8^2} = \sqrt{144+100+64} = \sqrt{308}$

⑤ $5V_2 - 3V_1$

$5V_2 = \langle 5(12), 5(10), 5(-8) \rangle = \langle 60, 56, -40 \rangle$
$3V_1 = \langle 3(8), 3(-12), 3(0) \rangle = \langle 24, -36, 0 \rangle$

$5V_2 - 3V_1 = \langle 36, 86, -40 \rangle$

⑥ $V_1 \cdot V_2 = \langle 8, -12, 0 \rangle \cdot \langle 12, 10, -8 \rangle = (8)(12) + (10)(-12) + (0)(-8) = 96 - 120 = -24$

$V_2 \cdot V_1 = \langle 12, 10, -8 \rangle \cdot \langle 8, -12, 0 \rangle = (12)(8) + (10)(-12) + (-8)(0) = -24$

⑦ $V_1 \times V_2$

i	j	k	i	j
8	~~12~~	~~0~~	~~8~~	-12
~~12~~	~~10~~	~~-8~~	~~12~~	~~10~~

$i = (-12)(-8) - (0)(10) = 96i$
$j = (0)(12) - (8)(-8) = 64j$
$k = (8)(10) - (-12)(12) = 224k$

$V_1 \times V_2 = \langle 96, 64, 224 \rangle$

$V_2 \times V_1$

i	j	k	i	j
12	~~10~~	~~-8~~	~~12~~	10
~~8~~	~~-12~~	~~0~~	~~8~~	~~-12~~

$i = (10)(0) - (-8)(-12) = -96i$
$j = (-8)(8) - (12)(0) = -64j$
$k = (12)(-12) - (10)(8) = -224k$

$V_2 \times V_1 = \langle -96, -64, -224 \rangle$

⑧ radius $= |m-d| = |12-8| = 4$
center $= (d+m, 8, 2000) = (12+8, 2000, 2000) = (20, 2000, 2000)$

r = radius
h, k, l = center

$(x-h)^2 + (y-k)^2 + (z-l)^2 = r^2$

LD $(x-20)^2 + (y-2000)^2 + (z-2000)^2 = 4^2$