HW 13.1 # 5, 17, 13.2 # 3, 5, 7, 15, 31, 33, 41, 49 due 9/20

13.1 √5.) $\langle 3, -5, 7\rangle + t\langle 3, 0, 1\rangle = \langle 3+3t, -5, 7+t\rangle$

√17.) $r(t) = (9\cos t)i + (9\sin t)j$

radius = 9 Center: (0,0) Plane: xy plane

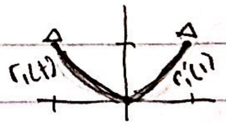
13.2 √3.) $\lim_{t \to 0} \langle e^{2t}, \ln(t+1), 4\rangle = \langle 1, 0, 4\rangle$

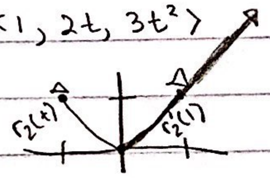
√5.) Evaluate $\lim_{h\to 0} \frac{r(t+h)-r(t)}{h}$ for $r(t) = \langle t^{-1}, \sin t, 4\rangle$

$$\lim_{h\to 0} \frac{r(t+h)-r(t)}{h} = \langle -\frac{1}{t^2}, \cos t, 0\rangle$$

√7.) $r(t) = \langle t, t^2, t^3\rangle \rightarrow r'(t) = \langle 1, 2t, 3t^2\rangle$

√15.)





√31.) $r(t) = \langle 1-t^2, 5t, 2t^3\rangle$, $t = 2$

$r(2) = \langle -3, 10, 16\rangle$

$r'(t) = \langle -2t, 5, 6t^2\rangle$

$r'(2) = \langle -4, 5, 24\rangle$

$l(t) = \langle -3-4t, 10+5t, 16+24t\rangle$

√33.) $r(s) = 4s^{-1}i - \frac{8}{3}s^{-3}k = \langle 4s^{-1}, 0, -\frac{8}{3}s^{-3}\rangle$, $s = 2$

$r(2) = \langle 4(\frac{1}{2}), 0, -\frac{8}{3}\cdot\frac{1}{8}\rangle = \langle 2, 0, 1/3\rangle$

$r'(s) = \langle -4s^{-2}, 0, 8s^{-4}\rangle$

$r'(2) = \langle -1, 0, 1/2\rangle$

$l(s) = \langle 2-s, 0, \frac{1}{3}+\frac{s}{2}\rangle$

√41.) $\int_{-2}^{2}(u^3 i + u^5 j)\,du = \int_{-2}^{2}\langle u^3, u^5\rangle\,du = \langle \frac{u^4}{4}\Big|_{-2}^{2}, \frac{u^6}{6}\Big|_{-2}^{2}\rangle = \langle 0, 0\rangle$

√49.) $r'(t) = t^2 i + 5t j + k = \langle t^2, 5t, 1\rangle$, $r(1) = j + 2k$

$r(t) = \frac{t^3}{3}i + \frac{5}{2}t^2 j + tk + ci + cj + ck = (\frac{t^3}{3}+c)i + (\frac{5}{2}t^2+c)j + (t+c)k$

$r(1) = (\frac{1}{3}+c)i + (\frac{5}{2}+c)j + (1+c)k = j + 2k$

$c = -\frac{1}{3}$ $c = -\frac{3}{2}$ $c = 1$

$r(t) = (\frac{t^3}{3} - \frac{1}{3})i + (\frac{5}{2}t^2 - \frac{3}{2})j + (t+1)k$