5: direction vector v: $\langle \cancel{3, 5, 7} \rangle$ $\langle 3, 0, 1 \rangle$ p. 728, 5, 9, 11, 13, 35, 41

point P: $(3, -5, 7)$

So, the line is $\vec{r}(t) = \vec{OP} + \vec{v}t$

$= \langle 3, -5, 7 \rangle + t\langle 3, 0, 1 \rangle$

9 a $\vec{r}(t) = \langle t+15, e^{0.08t}\cos t, e^{0.08t}\sin t \rangle$ (V) last two components are an expanding ~~helix~~ circle, and the first component makes a helix

b $\vec{r}(t) = \langle \cos t, \sin t, \sin 2t \rangle$ (i) because its circular ~~fro~~ in the first two components and is kind of twisted

c $\vec{r}(t) = \langle t, t, \frac{25t}{1+t^2} \rangle$ (ii) b/c z component $\to 0$ as $t \to 0$

d $\vec{r}(t) = \langle \cos^3 t, \sin^3 t, \sin 2t \rangle$ (vi) because its circular from the top and faster than (i)

e $\vec{r}(t) = \langle t, t^2, 2t \rangle$ (iv) b/c its y component $\to 0$ as $t \to 0$ and its parabolic from above.

f $\vec{r}(t) = \langle \cos t, \sin t, \cos t \sin 2t \rangle$ (iii) because its circular from top and its third component is zero more often.

11 (A) $\Leftrightarrow$ (ii) b/c it's a twisted circle.

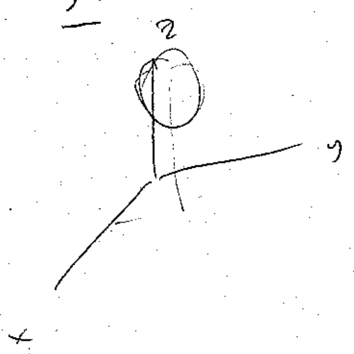
(B) $\leftrightarrow$ (iii) b/c it's got a lot of interlocking parts

(C) $\leftrightarrow$ (i) b/c its ~~co~~ twists are regular.

13 $\vec{r}(t) = 9\cos t\,\hat{i} + 9\sin t\,\hat{j}$.

circle of radius 9, centered at (0,0) in the xy-plane.

35



$\vec{r}(t) = \langle 1, 2 + 2\cos t, 5 + 2\sin t \rangle$

1: x coordinate is always 1

2: y coordinate of center

$2\cos t$: radius 2

5: z-coordinate of center

$0 \le t \le 2\pi$.

36 In the xy-plane you want $\left(\frac{x}{2}\right)^2 + \left(\frac{y}{3}\right)^2 = 1$ so

$x = 2\cos t, \ y = 3\sin t$.

and then translate by $\langle 9, -4, 0 \rangle$.

$\langle 9, -4, 0 \rangle + \langle 2\cos t, 3\sin t, 0 \rangle$.

41

$\vec{r}(t) = \langle |t| + t, |t| - t \rangle$. When in doubt, plot points.

t	(x,y)
0	0
1	(2,0)
2	(4,0)
−1	(0,2)
−2	(0,4)