pg 449 → Section 8.3

1 b) $\frac{x-1}{2} = \frac{y+1}{1} = \frac{z-3}{-1}$

"opposite" of those numbers

initial point is $\boxed{(1,-1,3)}$

d) $\frac{x+2}{-1} = \frac{z-1}{2}, \ y=-3$

initial point is $\boxed{(-2,-3,1)}$

5.

a) $P(-1,2,1)$ $\vec{d} = (3,-2,1)$

vector: $\vec{r} = (-1,2,1) + t(3,-2,1)$ $t \in R$

parametric $x=-1+3t, \ y=2-2t, \ z=1+t$

symmetric $\frac{x+1}{3} = \frac{y-2}{-2} = \frac{z-1}{1}$

5. b) $A(-1,1,0)$ $B(-1,2,1)$

$\vec{AB} = (-1-(-1), 2-1, 1-0)$

$\vec{AB} = (0,1,1)$

vector $\boxed{\vec{r} = (-1,1,0) + t(0,1,1) \quad t \in R}$

parametric
$$\boxed{\begin{aligned} x &= -1 \\ y &= 1+t \\ z &= t \end{aligned}}$$

symmetric $\boxed{x=-1, \quad \frac{y-1}{1} = \frac{z}{1}}$

*depending on your initial point there are multiple solutions. *

d) $D(-1,0,0)$ $E(-1,1,0)$

$\vec{DE} = (0,1,0)$

vector: $\boxed{\vec{r} = (-1,0,0) + t(0,1,0)}$

parametric
$$\boxed{\begin{aligned} x &= -1 \\ y &= t \\ z &= 0 \end{aligned}}$$

symmetric: since $x=-1$ and $z=0$
not possible to have a symmetric equation.

6. $\frac{x+6}{1} = \frac{y-10}{-1} = \frac{z-7}{1}$ $\frac{x+7}{1} = \frac{y-11}{-1}$; $z=5$

a) $x=-6+t$
$y=10-t$
$z=7+t$

$x=-7+t$
$y=11-t$
$z=5$

b) $\vec{d_1} = (1,-1,1)$ $\vec{d_2} = (1,-1,0)$

Find angle between $\vec{d}_1$ and $\vec{d}_2$

$$\vec{d}_1 \cdot \vec{d}_2 = |\vec{d}_1||\vec{d}_2| \cos\theta$$

$$\cos\theta = \frac{\vec{d}_1 \cdot \vec{d}_2}{|\vec{d}_1||\vec{d}_2|}$$

$$\cos\theta = \frac{(1,-1,1)\cdot(1,-1,0)}{\sqrt{3}\ \sqrt{2}}$$

Pg 450

$$\cos\theta = \frac{2}{\sqrt{3}\sqrt{2}}$$

$$\boxed{\theta \doteq 35.3^\circ}$$

9. $\vec{d}_1 = (k, 2, k-1) \quad \vec{d}_2 = (-2, 0, 1)$

If $\perp$ then $\vec{d}_1 \cdot \vec{d}_2 = 0$

$$(k, 2, k-1)\cdot(-2, 0, 1) = 0$$

$$-2k + k - 1 = 0$$

$$-k - 1 = 0 \longrightarrow \boxed{k = -1}$$

10 c) $\frac{x+1}{3} = \frac{y-2}{-1} = \frac{z}{4}$

point 1 $\boxed{(-1, 2, 0)}$

use parametric equations for more points:

$x = 3t - 1$

$y = -t + 2$

$z = 4t$

let $t = 1$

$x = 2, \ y = 1, \ z = 4$

$\boxed{(2, 1, 4)}$

Let $t = 2$

$x = 5, \ y = 0, \ z = 8$

$\boxed{(5, 0, 8)}$