### 3. \( \alpha \) \( (2, -4) + t(1, 2) \)  
\( b \) \( (0, 2) + t(2, 1) \)  
\( c \) \( (3, 1) + t(2, -3) \)  

### 4. \( \alpha \) \( \frac{6}{\sqrt{5}} \)  
\( b \) \( 4 / \sqrt{10} \)  
\( c \) \( 3 / \sqrt{5} \)  

### 5. \( \alpha \) \( (0, 1, 2) + t(-2, 2, -1) \)  
\( b \) \( (2, -1, 4) + t(0, 0, 1) \)  
\( c \) \( (3, -2, 1) + t(0, 1, 0) \)  
\( d \) \( (2, -2, 3) + t(3, -2, 1) \)  
\( e \) \( t(1, -2, 0) \)  

### 4. Find the distance from the given point to the given line.  
\( a \) \( \vec{r} = (-1, -2) + t(-1, -2), \ B(0, 2) \)  
\( b \) \( x = \frac{3}{4}, \ y = \frac{2}{3}, \ B(1, 3) \)  
\( c \) \( x + 2y - 3 = 0, \ B(0, 0) \)  

### 5. Find the vector equation of a line that:  
\( a \) passes through the points \( A(0, 1, 2) \) and \( B(-2, -3, 1) \)  
\( b \) passes through the point \( A(2, -1, 4) \) and is perpendicular on the \( xy \) plane  
\( c \) passes trough the point \( A(3, -2, 1) \) and is parallel to the \( y \)-axis  
\( d \) passes through the point \( A(2, -2, 3) \) and is parallel to the vector \( \vec{u} = (3, -2, 1) \)  
\( e \) passes through the origin \( O \) and is parallel to the vector \( \vec{i} - 2\vec{j} \)  

### 6. \( \alpha \) \( \int x = 3t \)  
\( \beta \) \( y = 1 + 4t \)  
\( \gamma \) \( z = 2 + 5t \)  
\( b \) \( (-1, 1, 2) + t(-2, 3, 0) \)  

### 6. Convert the equation(s) of the line from the vector form to the parametric form or conversely:  
\( a \) \( \vec{r} = (0, 1, 2) + t(3, 4, 5) \)  
\( x = -1 + 2t \)  
\( y = 1 + 3t \)  
\( z = 2 \)  

### 7. \( \alpha \) \( \int x = t \)  
\( \beta \) \( y = \frac{1}{2} x = \frac{1}{2} - \frac{2}{3} t \)  
\( \gamma \) \( z = 2 + 3t \)  
\( b \) \( \frac{x+1}{2} = \frac{y-2}{2}, \ z = -4 \)  
\( (-1, 2, -4) + t(-1, -2, 0) \)  
\( c \) \( \int x = \frac{1}{x} - \frac{x}{t}, \ y = -\frac{x}{2} - \frac{x}{2}, \ z = -\frac{x}{2} - \frac{x}{2} \)  
\( \frac{x-1}{2} = \frac{y+2}{2} = \frac{z+3}{2} \)  

### 8. \( 0, 0, 0, -1 \)  

### 9. \( -4, 5, 0 \)  
\( 0, 1, 8 \)  
\( 1, 0, 10 \)  

### 8. Find the x-int, y-int, and z-int for the line \( \vec{r} = (1, -2, 3) + t(1, -2, 4) \) if they exist.  

### 9. Find the xy-int, yz-int, and zx-int for the line \( \vec{r} = (-2, 3, 4) + t(-1, -2, 4) \) if they exist.  

### 10. \( \alpha \) parallel  
\( b \) not parallel  
\( c \) parallel  

### 10. Find if the lines are parallel or not:  
\( a \) \( \vec{r} = (1, 2, 3) + t(1, -2, 3), \ \vec{r} = (3, 2, 1) + s(-2, 4, -6) \)  
\( b \) \( \vec{r} = (1, 2, 3) + t(2, 1, 3), \ \vec{r} = (3, 2, 1) + s(4, 2, -6) \)  
\( c \) \( \vec{r} = (5, 0, 5) + t(-3, 3, -6), \ \vec{r} = (3, 2, 1) + s(1, -1, 2) \)  

### 11. In the case the lines are parallel and distinct, find the distance between the lines.  
\( a \) \( \vec{r} = (1, 2, 3) + t(1, -2, 3), \ \vec{r} = (3, 2, 1) + s(-2, 4, -6) \)  
\( b \) \( \vec{r} = (1, 2, 3) + t(2, 1, 3), \ \vec{r} = (3, 2, 1) + s(4, 2, -6) \)  
\( c \) \( \vec{r} = (5, 0, 5) + t(-3, 3, -6), \ \vec{r} = (3, 2, 1) + s(1, -1, 2) \)