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| --- | --- |
|  | ((10,10,6)−(5,5,4))×((10,10,3)−(5,5,5)) =(5,5,2)×(5,5,−2)=(−20,20,0)  is perpendicular to both lines; therefore, (−20,20,0)⋅*u*  is constant along each line. If this constant is not the same for each line, the lines do not intersect. In this case, the constant for each line is 0  , so the lines intersect.  (5,5,2)×(−20,20,0)=(−40,−40,200)  is perpendicular to the first line; therefore, (−40,−40,200)⋅*u*  is constant along the first line. In this case, that constant is 400. The general point along the second line is  (5,5,5)+(5,5,−2)*t*  To compute the point of intersection, find the *t*  so that  (−40,−40,200)⋅((5,5,5)+(5,5,−2)*t*)=400600−800*t*=400*t*=1/4  Plugging *t*=1/4  into the formula for a point along the second line, yields the point of intersection:  (5,5,5)+(5,5,−2)⋅1/4=(254 ,254 ,92 )  **The second example**  ((12,15,4)−(6,8,4))×((12,15,6)−(6,8,2)) =(6,7,0)×(6,7,4)=(28,−24,0)  is perpendicular to both lines; therefore, (28,−24,0)⋅*u*  is constant along each line. If this constant is not the same for each line, the lines do not intersect. In this case, the constant for each line is −24, so the lines intersect.  (6,7,0)×(28,−24,0)=(0,0,−340)  is perpendicular to the first line; therefore, (0,0,−340)⋅*u*  is constant along the first line. In this case, that constant is −1360  . The general point along the second line is  (6,8,2)+(6,7,4)*t*  To compute the point of intersection, find the *t*  so that  (0,0,−340)⋅((6,8,2)+(6,7,4)*t*)=−1360−680−1360*t*=−1360*t*=1/2  Plugging *t*=1/2  into the formula for a point along the second line, yields the point of intersection:  (6,8,2)+(6,7,4)⋅1/2=(9,232 ,4) |