[1] $\sqrt{14}$

[2] $\langle 8, 1, 0 \rangle$

[3] 5

[4] $\langle -2, 16, 11 \rangle$

[5] $\sqrt{18}$

[6] $\langle 7, 7, -2 \rangle$

[7] 9

[8] $\langle -3, -3, -21 \rangle$

[9] $\cos^{-1}\left(\dfrac{5}{\sqrt{29}\sqrt{14}}\right) \approx 75.6^\circ$

[10] $\cos^{-1}\left(\dfrac{9}{\sqrt{30}\sqrt{18}}\right) \approx 67.2^\circ$

[11] $(2, 60^\circ, 2)$

[12] $(2\sqrt{2}, 45^\circ, 60^\circ)$

[13] $(2, 30^\circ, 2)$

[14] $(2\sqrt{2}, 45^\circ, 30^\circ)$

[15] $(x, y, z) = (1, \pm 0.5, 3)$

[16] no solution

[17] Let $\vec{u} = \langle u_1, u_2, u_3 \rangle$ and $\vec{v} = \langle v_1, v_2, v_3 \rangle$. Then the first component of $\vec{u} \times \vec{v}$ is $u_2 v_3 \pm u_3 v_2$, while the first component of $\vec{u} \times \vec{v}$ is $v_2 u_3 \pm v_3 u_2$. Since these components are not equal, the cross products are not equal.

[18] Let $\vec{u} = \langle u_1, u_2, u_3 \rangle$, $\vec{v} = \langle v_1, v_2, v_3 \rangle$, and $\vec{w} = \langle w_1, w_2, w_3 \rangle$. Then $\vec{u} \bullet (\vec{v} + \vec{w}) =$
$\langle u_1, u_2, u_3 \rangle \bullet \langle v_1 + w_1, v_2 + w_2, v_3 + w_3 \rangle = \langle u_1(v_1 + w_1), u_2(v_2 + w_2), u_3(v_3 + w_3) \rangle =$
$\langle u_1 v_1 + u_1 w_1, u_2 v_2 + u_2 w_2, u_3 v_3 + u_3 w_3 \rangle = (\vec{u} \bullet \vec{v}) + (\vec{u} \bullet \vec{w})$

[19] $t = 12$

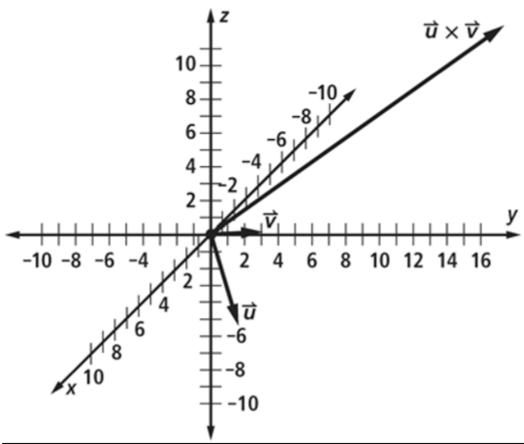
[20] $t = \frac{\pm 2}{3}$

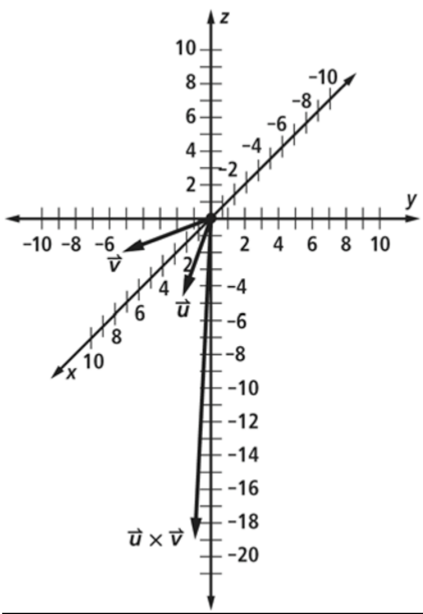
[21] $t = \frac{\pm 4}{3}$

[22] $t = 6$

[23] $2 \bullet 6 \bullet \sin 45° \approx 8.49$ ft-lbs

[24] $40 \bullet 60 \bullet \sin 40° = 1542.69$ kilogram-meters

[25] 

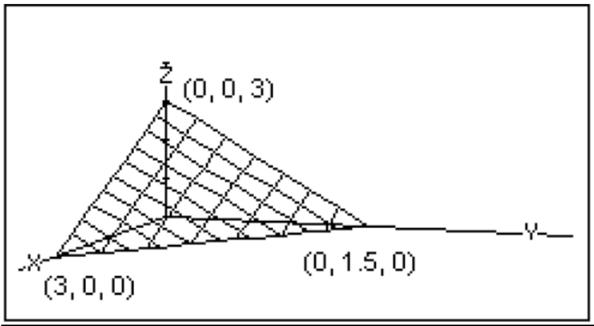
[26] 

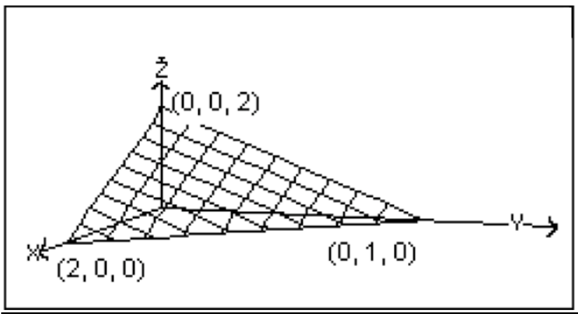
[27] Answers vary. Sample: $3x + 2y \pm z = 13$

[28] Answers vary. Sample: $\langle x - 4, y + 1, z + 1 \rangle = t \langle 3, 2, -1 \rangle$

[29] Answers vary. Sample: $x + 3y \pm z = 8$

[30] Answers vary. Sample: $\langle x - 2, y + 2, z + 1 \rangle = t \langle 1, 3, \pm 1 \rangle$

[31] 

[32] 

[33] The system consists of 3 planes that intersect in one point.

[34] The system consists of 2 parallel planes that intersect a third plane.