Question #1 Pick 1 questions, 0 pts per question

Question

(3 points) 1. Determine the distance between the points $P\,(2,-6,3)$ and $Q\,(4,1,-2)$.

Question

(3 points) 1. Determine the distance between the points $P\,(5,2,-3)$ and $Q\,(-1,4,2)$.

Question #2 Pick 1 questions, 0 pts per question

Question

(3 points) 2. Find the parametric form of the equation of the line passing $P\,(4,-6,2)$ and $Q\,(8,-2,3)$.

Question

(3 points) 2. Find the parametric form of the equation of the line passing $P\,(7,3,-2)$ and $Q\,(3,5,-1)$.

Question #3 Pick 1 questions, 0 pts per question

Question

3. Given the following vectors: $\vec{a} =< 3,-1,5 >$, $\vec{b} =< -4,2,1 >$, and $\vec{c} =< 6,1,3 >$. Determine the following:

(2 points) a. $3\vec{a} - 4\vec{b}$

(2 points) b. $|\mathbf{a}|$

(3 points) c. $\vec{a} \cdot \vec{c}$

(2 points) d. The unit vector in the direction of $\vec{c}$

(4 points) e. $\vec{a} \times \vec{b}$

(3 points) f. $proj_{\vec{b}}\vec{a}$

(4 points) g. Find the area of the parallelogram determined by $\mathbf{b}$ and $\vec{c}$

Question

3. Given the following vectors: $\vec{a} =< 2,-4,1 >$, $\vec{b} =< 5,3,-6 >$, and $\vec{c} =< 4,2,3 >$. Determine the following:

(2 points) a. $5\vec{a} - 2\vec{c}$

(2 points) b. $|\vec{c}|$

(3 points) c. $\vec{b} \cdot \vec{c}$

(2 points) d. The unit vector in the direction of $\mathbf{b}$

(4 points) e. $\vec{a} \times \vec{c}$

(3 points) f. $proj_{\vec{c}}\vec{a}$

(4 points) g. Find the area of the parallelogram determined by $\vec{a}$ and $\mathbf{b}$

Question #4 Pick 1 questions, 0 pts per question

Question

(4 points) 4. Find the equation of the plane that passes through the points $P\,(3, 5, -1)$, $Q\,(1, 4, 2)$, and $R\,(-2, 1, 5)$.

Question

(4 points) 4. Find the equation of the plane that passes through the points $P\,(-2, 5, 3)$, $Q\,(1, 4, -3)$, and $R\,(4, 2, -1)$.

Question #5 Pick 1 questions, 0 pts per question

Question

(4 points) 5. A sled is pulled along a level path through snow by a rope. A 20-lb force acting at an angle of $35°$ above the horizontal moves the

sled 80 ft. Find the work done by the force. (Round your answer to the nearest whole number.)

Question

(4 points) 5. A sled is pulled along a level path through snow by a rope. A 30-lb force acting at an angle of $25°$ above the horizontal moves the sled 60 ft. Find the work done by the force. (Round your answer to the nearest whole number.)

Question #6 Pick 1 questions, 0 pts per question

Question

(4 points) 6. Find the distance from the point $P\,(2, 3, 1)$ to the plane $3x + 2y + 4z = 6$.

Question

(4 points) 6. Find the distance from the point $P\,(1, 4, 2)$ to the plane $3x + 2y + 4z = 6$.

Question #7 Pick 1 questions, 0 pts per question

Question

(4 points) 7. Find the volume of the parallelepiped determined by the vectors $\vec{a} =< 3, 6, -1 >$, $\vec{b} =< 1, 4, 2 >$, and $\vec{c} =< -1, 3, 4 >$.

Question

(4 points) 7. Find the volume of the parallelepiped determined by the vectors $\vec{a} =< 1, 5, -3 >$, $\vec{b} =< 3, 1, -2 >$, and $\vec{c} =< 2, 4, 3 >$.

Question #8 Pick 1 questions, 0 pts per question

Question

(4 points) 8. Find the parametric form of the equation of the tangent line to the curve traced by the vector function $\vec{r}(t) = \sqrt{t^2 + 48}\hat{i} + \ln(t^2 + 48)\hat{j} + (t)\hat{k}$ when $t = 1$.

Question

(4 points) 8. Find the parametric form of the equation of the tangent line to the curve traced by the vector function $\vec{r}(t) = \sqrt{t^2 + 35}\hat{i} + \ln(t^2 + 35)\hat{j} + (t)\hat{k}$ when $t = 1$.

Question #9 Pick 1 questions, 0 pts per question

Question

(3 points) 9. Evaluate the following limit: $\lim_{t\to 0} \vec{r}(t)$ where $\vec{r}(t) =< \cos(2t), t^2+1, (e^{2t}+3) >$.

Question

(3 points) 9. Evaluate the following limit: $\lim_{t\to 0} \vec{r}(t)$ where $\mathbf{r}(t) =< t^3+1, \sin(2t), (e^{2t}+3) >$.

Question #10 Pick 1 questions, 0 pts per question

Question

(6 points) 10. Find the length of the curve traced by $\mathbf{r}(t) = 6\hat{\mathbf{i}} + (t^2)\hat{\mathbf{j}} + (\frac{1}{9}t^3)\hat{\mathbf{k}}$ on $0 \le t \le 1$.

Question #11 Pick 1 questions, 0 pts per question

Question

11. Given the position vector

$\vec{r}(t) = (6t^2)\hat{i} + (\sin t - t\cos t)\hat{j} + (\cos t + t\sin t)\hat{k}$

(4 points) a. Find the unit tangent vector, $\hat{T}(t)$.

(4 points) b. Find the unit normal vector, $\hat{N}(t)$.

(4 points) c. Find the the binormal vector, $\hat{B}(t)$.

(3 points) d. Find the curvature, κ.

Question #12 Pick 1 questions, 0 pts per question

Question

(4 points) 12. Evaluate the following integral:
$\int [\frac{1}{t^4}\hat{i} + (\cos 4t)\hat{j} + (e^{5t})\hat{k}]dt$

Question

(4 points) 12. Evaluate the following integral:
$\int [\frac{1}{t^3}\hat{i} + (\sin 2t)\hat{j} + (e^{3t})\hat{k}]dt$

Question #13 Pick 1 questions, 0 pts per question

Question

(4 points) 13. Evaluate the following integral:
$\int_0^2 [(t^2+3)\hat{i} + (\sin t)\hat{j} + (e^{2t})\hat{k}]dt$

Question #14 Pick 1 questions, 0 pts per question

Question

(4 points) 14. Given the acceleration vector $\vec{a}(t) = (7t)\hat{i} + (e^t)\hat{j} + (e^{-t})\hat{k}$. Find the position vector, $\vec{r}(t)$, given $\mathbf{r}(0) = 4\hat{\mathbf{j}} + 2\hat{\mathbf{k}}$ and $\vec{v}(0) = 3\hat{i} + 5\hat{j} - 2\hat{k}$.

Question

(4 points) 14. Given the acceleration vector $\vec{a}(t) = (5t)\hat{i} + (e^t)\hat{j} + (e^{-t})\hat{k}$. Find the position vector, $\vec{r}(t)$, given $\vec{r}(0) = 3\hat{j} + 4\hat{k}$ and $\vec{v}(0) = 4\hat{i} - 2\hat{j} + 3\hat{k}$.

Question #15 Pick 1 questions, 0 pts per question

Question

15. Identify the following surfaces.

(1 point) a. $\frac{x^2}{16} + \frac{y^2}{25} + \frac{z^2}{9} = 1$

(1 point) b. $\frac{x^2}{25} + \frac{y^2}{9} = \frac{z^2}{16}$

(1 point) c. $x^2 + y^2 + z^2 = 36$

Question

15. Identify the following surfaces.

(1 point) a. $\frac{x^2}{16} + \frac{y^2}{4} = \frac{z^2}{25}$

(1 point) b. $x^2 + y^2 + z^2 = 25$

(1 point) c. $\frac{x^2}{25} + \frac{y^2}{9} + \frac{z^2}{16} = 1$