1. Find $|\vec{u}+\vec{v}|$ if $\vec{u}=\langle 2,-1,1\rangle$ and $\vec{v}=\langle -1,3,13\rangle$.

2. Determine whether the vectors $\vec{u}=\langle 1,2,2\rangle$, $\vec{v}=\left\langle \sqrt{2},1,-1\right\rangle$ are orthogonal, parallel or neither. If neither, also find the angle between two vectors.

3. Find $\cos\widehat{ABC}$ if $A\,(1,4)$, $B\,(2,2)$ and $C\,(3,5)$. Find the measure of the angle $\widehat{ABC}$.

4. Find $\cos\widehat{BCA}$ if $A\,(1,4)$, $B\,(2,2)$ and $C\,(3,5)$. Find the measure of the angle $\widehat{ABC}$.

5. Find the vector projection $proj_{\vec{v}}\vec{u}$ if $\vec{u}=\langle 2,-1\rangle$ and $\vec{v}=\langle 1,3\rangle$.

6. Find the vector projection $proj_{\vec{v}}\vec{u}$ if $\vec{u}=\langle 0,1,2\rangle$ and $\vec{v}=\left\langle 1,1,\sqrt{2}\right\rangle$.

7. Find $|\vec{u}\times\vec{v}|$ if $|\vec{u}|=5, |\vec{v}|=6$, and the angle between $\vec{u}$ and $\vec{v}$ is 30°.

8. Find symmetric equations of the line through the point $P_0\,(-2,1,3)$ and parallel to the line $x=2+t,\ y=-1+5t,\ z=4t$.

9. Find a vector equation of the line trhough the points $A\,(2,4,3)$ and $B\,(1,2,-1)$. Also give parametric equations for the line. Where does the line intersect $xz-$plane?

10. Determine whether the planes $2x+y-z=1$ and $x+y+3z=2$ are parallel, perpendicular or neither. If neither, also find the angle between two planes.

11. Determine whether the planes $\sqrt{2}x+y+z=1$ and $\sqrt{2}x-y+z=5$ are parallel, perpendicular or neither. If neither, also find the angle between two planes.

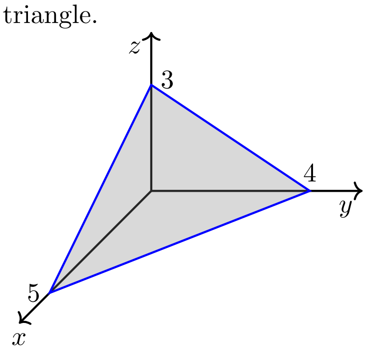
12. Find the distance from the point $P\,(4,5,6)$ to the plane $2x-y+z=6$.

13. Let $\mathcal{P}$ be the plane containing the point $(2,1,1)$ and perpendicular to x-axis. Which of the following sets of equations describes the intersection of the plane $\mathcal{P}$ with the sphere of radius 3 centered at the origin?

14. Let $\mathcal{P}$ be the plane with equation $x+2y+z=10$ and l be the line through the points $A\,(1,0,-1)$ and $B\,(2,1,1)$. Find the point of intersection if they intersect.

15. By using triple product, find the volume of the parallelepiped determined by the vectors $\vec{u}=\langle 0,2,1\rangle$, $\vec{v}=\langle -1,3,0\rangle$ and $\vec{w}=\langle 2,1,-1\rangle$.

16. Find an equation of the plane containing the given triangle.



17. Calculate the dot product $(\vec{u}+\vec{v})\cdot(\vec{u}-\vec{v})$ if $\vec{u}=\boldsymbol{i}+\boldsymbol{3j}+\boldsymbol{k}$ and $\vec{v}=5\boldsymbol{i}-\boldsymbol{j}-2\boldsymbol{k}$. Is the angle between the vectors $\vec{u}+\vec{v}$ and $\vec{u}-\vec{v}$ obtuse or acute? Find the angle between $\vec{u}$ and $\vec{v}$.

18. Calculate the cross product $(\vec{u}+2\vec{v})\times(2\vec{u}-\vec{v})$ if $\vec{u}=\boldsymbol{j}+2\boldsymbol{k}$ and $\vec{v}=2\boldsymbol{i}-\boldsymbol{j}+\boldsymbol{k}$.

19. Find the limit $\lim\limits_{t\to 2}\left\langle t^2,\dfrac{\sin(t-2)}{t^2-4},e^t\right\rangle$.

20. For the vector function $\vec{r}\,(t)=\left\langle t^2,\cos t,e^{2t}\right\rangle$ find the second order derivative when $t=0$. In other words, $\vec{r}\,''(0)=?$

21. Find the rate of change for vector function $\vec{r}\,(t)=\langle\sin t,\cos t,\tan t\rangle$ when $t=\pi/6$.

22. Determine whether the vector-valued function $\vec{r}\,(t)=\left\langle\dfrac{1}{t+2},\ln(t-2),t^2\right\rangle$ is continuous or not at $t=2$.

23. Find the vector function $\vec{r}\,(t)$ if $\vec{r}\,'(t)=\langle 2t,\cos t,e^t\rangle$ and $\vec{r}\,(0)=\langle 1,2,3\rangle$.

24. Evaluate the integral $\displaystyle\int_0^1\left(t\boldsymbol{i}+\frac{2t}{1+t^2}\,\boldsymbol{j}+e^t\boldsymbol{k}\right)dt$.

25. The velocity of an object is given by $\vec{v}\,(t)=\left\langle 2t,\sin t,\dfrac{1}{t+1}\right\rangle$ and $\vec{v}\,(0)=\langle 1,1,1\rangle$. Find the position function $\vec{r}\,(t)$.

26. Find the length of the curve $\vec{r}\,(t)=\left\langle\sqrt{5}t,\cos 2t,-\sin 2t\right\rangle$ from $t=0$ to $t=2\pi$.

27. Find the unit tangent vector $\vec{T}\,(t)$ to the curve $\vec{r}\,(t)=\langle t,\cos t,\sin t\rangle$ at $t=\pi/3$.

28. Find the curvature of the function $\vec{r}\,(t)=\left\langle t,t^2,0\right\rangle$ at $t=1$.