AP Calculus BC – Unit 8 Part 3 Extra Practice

8.7 – Extra Practice

Show that the vectors $\vec{u}$ and $\vec{v}$ between the given points are equivalent.

#5b. $\vec{u}: (-4,0)\ to\ (1,8)$

$\vec{v}: (2,-1)\ to\ (7,7)$

Find the magnitude of the vector.

#6b. $\vec{a} = \langle -3,0 \rangle$

#7b. $\vec{a} = \langle 12,-5 \rangle$

#8b. $\vec{a} = \langle -10,3 \rangle$

For the given vectors, find the new vectors: $\frac{2}{3}\vec{a}$, $3\vec{b}$, $\vec{b}-\vec{a}$, $2\vec{a}+5\vec{b}$.

#9b. $\vec{a} = \langle -3,-8 \rangle$

$\vec{b} = \langle 8,25 \rangle$

For the given vector, find: $\left|\vec{a}\right|$, $\dfrac{\vec{a}}{\left|\vec{a}\right|}$, $\left|\dfrac{\vec{a}}{\left|\vec{a}\right|}\right|$.

#10b. $\vec{a} = \langle 4, -7 \rangle$

Convert the given vector into its x- and y-components.

#11b. $\left|\vec{a}\right| = 2, \quad \theta = 150°$

8.8 – Extra Practice

Find the domain of the vector-valued function.

#4b. $\vec{r}(t) = \left\langle \sqrt{4-t^2},\ t^2 \right\rangle$

#5b. $\vec{r}(t) = \left\langle \sin(t),\ \cos(t) \right\rangle$

For the vector-valued function $\vec{r}(t) = \left\langle \frac{1}{2}t^2,\ -t+1 \right\rangle$ evaluate at its indicated input value.

#6b. $\vec{r}(s+1)$

#7b. $\vec{r}(2+\Delta t) - \vec{r}(2)$

Sketch the plane curve for the given vector-valued function (with direction arrows).

#8b. $\vec{r}(t) = \left\langle 5-t,\ \sqrt{t} \right\rangle$

#9b. $\vec{r}(t) = \left\langle t^2+t,\ t^2-t \right\rangle$

Sketch the plane curve for the given vector-valued function (with direction arrows).

#10b. $\vec{r}(t) = \langle 3\sin(t),\ 3\cos(t) \rangle$

Find $\vec{r}'(t)$ then $\vec{r}\left(\frac{\pi}{2}\right)$ and $\vec{r}'\left(\frac{\pi}{2}\right)$. Then sketch the plane curve, and add the vectors to your sketch $\vec{r}\left(\frac{\pi}{2}\right)$ and $\vec{r}'\left(\frac{\pi}{2}\right)$.

#11b. $\vec{r}(t) = \langle \cos(t),\ \sin(t) \rangle$

8.9 – Extra Practice

Position vector $\vec{r}(t)$ represents the path of an object moving on a plane.

(a) Find $\vec{v}(t)$, $\vec{a}(t)$ and the speed of the object at time *t*.

(b) Evaluate the position, velocity, and acceleration vectors at the given time.

(c) Sketch the path of the object and add the position, velocity, and acceleration vectors at the given time to your sketch.

#4b. $\vec{r}(t)=\langle t,\ -t^2+4\rangle \ at\ t=1$

#5b. $\vec{r}(t)=\left\langle \frac{1}{4}t^3+1,\ t\right\rangle \ at\ t=2$

Position vector $\vec{r}(t)$ represents the path of an object moving on a plane.

(a) Find $\vec{v}(t),\ \vec{a}(t)$ and the speed of the object at time *t*.

(b) Evaluate the position, velocity, and acceleration vectors at the given time.

(c) Sketch the path of the object and add the position, velocity, and acceleration vectors at the given time to your sketch.

#6b. $\vec{r}(t)=\langle t-\sin(t),\ 1-\cos(t)\rangle \ at\ t=\pi$

The velocity vector and the position of a particle at time *t* = *0* are given.

(a) Find the position of the particle at time *t* = *3*.

(b) Find the total distance traveled by the particle from $0 \le t \le 3$.

(c) Find the position vector for any time *t*.

(d) Find the displacement of the particle from $0 \le t \le 3$.

#7b. $\vec{v}(t) = \langle 8t - 1,\ 6t^2 + 1 \rangle, \quad \vec{r}(0) = \langle 4, 0 \rangle$

Use the given information to find the velocity and position vectors. Then find the position at time *t* = *2*.

#8b. $\vec{a}(t)=\langle t,\ \sin(t)\rangle,\quad \vec{v}(0)=\langle 0,-1\rangle,\quad \vec{r}(0)=\langle 0,0\rangle$