§11.3 & §11.4 # WrittenHW #4 TMath 126

1. [5] Identify which of the following expressions are meaningful. If they are meaningful, identify the object returned. If not meaningful, explain why in complete sentences.

   (a) $(\vec{v} \cdot \vec{w})\vec{z}$

   (b) $\vec{v} \cdot \vec{w} + \vec{z}$

   (c) $||\vec{v}||(\vec{w} \times \vec{z})$

   (d) $(\vec{v} \cdot \vec{w}) \times (\vec{w} \cdot \vec{z})$

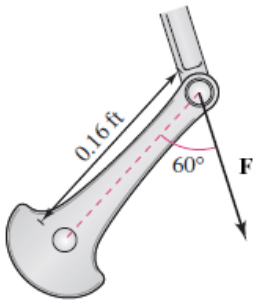
   (e) $(\vec{v} \times \vec{w}) \cdot (\vec{w} \times \vec{z})$

2. The vector $\vec{q} = \langle 3200, 1460, 2230 \rangle$ denotes the number of chicken sandwiches, hamburgers, and cheeseburgers, respectively, were sold at a fast-food restaurant in one week. The vector $\vec{p} = \langle 2.95, 2.25, 2.65 \rangle$ gives the prices (in dollars).

   (a) [2] Find $\vec{q} \cdot \vec{p}$ and interpret its meaning.

   (b) [2] Explain vector operation must be done to find the total revenue from chicken sandwiches, hamburgers, and cheeseburgers if prices increase by 3%.

3. [6] Both magnitude and direction of force change on a crankshaft as it rotates. Find the torque on the crankshaft at the position shown below when the force is 1500lb.



1. Consider P defined by $6x-3y+z=5$, Q defined by $\langle -1,1,5\rangle \cdot (\langle x,y,z\rangle - \langle 0,0,5\rangle) = 0$, and R defined by $x = 6-3t$, $y = -1+2t$ and $z = 5+4t$.

   (a) [3] Identify what kinds of objects P, Q and R are.

   (b) [3] Determine if Q and R intersect.

   (c) [5] Given that P and Q intersect, find the angle created between these two objects.

2. [4] Data was collected on three different kinds of personal recreation expenditures from 2005 to 2010. The amounts are recorded in billions of dollars. A model for the data given below is $0.46x + .30y - z = 4.94$.

Year	2005	2006	2007	2008	2009	2010	
amusement parks & campgrounds (x)	36.4	39.0	42.4	44.7	43.0	45.2	
live entertainment (y)	15.3	16.1	17.4	17.5	17.0	17.3	
spectator sports (z)	16.4	18.1	20.0	20.5	20.1	21.4	

   Remake the fourth row in the table above using the model given to approximate spectator sports (z). Compare the approximation with the actual values of spectator sports (z) recorded for each year.