Prepare a summary of the material & look at homework and quizzes before doing the review.

1. Convert the following equations from polar to rectangular coordinates, as appropriate:
   (a) $x^2 + y^2 - 3x = 0$,
   (b) $r = -4\sin\theta$.
2. Sketch the following (polar) equations:
   (a) $r = \cos 2\theta$,
   (b) $r = 1 + 2\cos\theta$,
   (c) $r = 2/(1 - \cos\theta)$
3. Find the following areas:
   (a) Shared by $r = 2(1 - \sin\theta)$ and $r = 2(1 + \sin\theta)$.
   (b) Bounded by one leaf of $r = 4\sin 3\theta$.
   (c) Inside $r = 1 + \cos 2\theta$ and outside $r = 1$.
4. Find the length of the curves given by the following polar equations:
   (a) $r = 2\sin\theta + 2\cos\theta$, $0 \le \theta \le \pi/2$.
   (b) $r = \sqrt{1 + \cos 2\theta}$, $-\pi/2 \le \theta \le \pi/2$.
5. Show that the vector $\mathbf{u} + \mathbf{v}$ bisects the angle between vectors $\mathbf{u}$ and $\mathbf{v}$ if and only if $|\mathbf{u}| = |\mathbf{v}|$.
6. If $P = (3, 1, 2)$, $Q = (1, 0, 1)$ and $R = (4, 2, -1)$, is $\triangle PQR$ a right-angled triangle? What is the area of this triangle?
7. Find the distance between the given objects:
   (a) $(0, -1, 1)$ and the plane $2x - 3y = 2$,
   (b) $(2, 0, 1)$ and the line through $(1, -2, 2)$ and $(3, 0, 2)$,
   (c) $(2, -1, -1)$ and the plane determined by $(1, 1, 4)$, $(3, 0, 1)$, and $(0, -2, 2)$.
8. (a) Find the line of intersection of the planes $x + 2y + z = 1$ and $x - y + 2z = -8$.
   (b) Find A so that, for the planes $x + 2y + z = 3$ and $Ax - 4y + 3z = 5$, the line of intersection contains $(2, 0, 1)$.
9. See Problem 62 on page 659. The figure in this problem shows a parallelogram with vertices $A = (2, -1, 4)$, $B = (1, 0, -1)$, $C = (1, 2, 3)$ and D. Find:
   (a) the coordinates of D,
   (b) the cosine of the interior angle at B,
   (c) the vector projection of $\overrightarrow{BA}$ onto $\overrightarrow{BC}$,

(d) the area of the parallelogram, and

(e) the equation of the plane containing the parallelogram.

10. (a) Find the velocity and acceleration vectors for $\mathbf{r}(t) = (e^{-t})\vec{\imath}+(2\cos 3t)\vec{\jmath}+(2\sin 3t)\vec{k}$.

(b) Find the tangent line to the curve $\mathbf{r}(t) = (\cos t)\vec{\imath}+(\sin t)\vec{\jmath}+(\sin 2t)\vec{k}$ at $t = \pi/2$.