## Answers to Even Exercises, Homework Set 2

Section $9.4 \# 4$ (a) 6, (b) the $x$-component is positive, the $y$-component is negative, and the $z$-componenet is zero


$$
\begin{aligned}
\# 8 & \vec{a} \times \vec{b}=<2,-14,1>, \text { since }<2,-14,1>\cdot<5,1,4>=0, \vec{a} \text { is } \\
& \text { perpindicular to } \vec{a} \times \vec{b} \text {, similarily } \vec{b} \text { is perpindicular to } \vec{a} \times \vec{b} \\
\# 12 & \vec{a} \times \vec{b}=<2,-1,1> \\
\# 16 & \text { area }=\sqrt{15^{2}+40} \approx 16.28
\end{aligned}
$$

Section $9.5 \# 14$ a) $x=2 t+5, y=-t+1, z=t$
b) $(0,7 / 2,-5 / 2)$,
$(7,0,1),(5,1,0)$
\#16 $x=-5 t+10, y=3 t+3, z=-4 t+1$, with $0 \leq t \leq 1$
\#18 They are not parallel and do not intersect, so they are skew
$\# 22 y+2 z=-6$
$\# 303 x+3 y+3 z=12$
\#40 a) $(2,0,2)$,
b) $x+y=2$

Section 9.6 \# 2 III
\# 6 The domain is the set of all $(x, y)$ with $x y \geq 0$, so it is the first and third quadrant of the $x-y$ plane, including the $x$ and $y$ axes. \#12
12. $z=\cos x$, a "wave."

\#14


Combining these traces we form the graph

(b)

(c)

$h(x, y)$ is the graph of $g(x, y)$ shifted upward 3 units.
\#18

\#24
24. (a) The traces of $z^{2}=x^{2}+y^{2}$ in $x=k$ are $z^{2}=y^{2}+k^{2}$, a family of hyperbolas, as are traces in $y=k, z^{2}=x^{2}+k^{2}$. Traces in $z=k$ are $x^{2}+y^{2}=k^{2}$, a family of circles.
(b) The surface is a circular
cone with axis the $z$-axis.

(c) The graph of $f(x, y)=\sqrt{x^{2}+y^{2}}$ is the upper half of the cone in part (b), and the graph of $g(x, y)=-\sqrt{x^{2}+y^{2}}$ is the lower half.



Section $9.7 \# 14 \Theta=\pi / 3$ is the plane that goes through $(0,0,0)$, is perpindicular to the $x-y$ plane and contains the line $z=0, \Theta=\pi / 3$ in the $x-y$ plane.
\#16 Cylinder of radius 2 around the z -axis
\#32 a) $14.5 \leq \rho \leq 15 \quad$ b) $14.5 \leq \rho \leq 15$ and $0 \leq \Theta \leq \pi$ is one possible answer

