(a) $\overrightarrow{PQ} = \langle -1, 3, -2 \rangle$ and $\overrightarrow{PR} = \langle 1, -1, 1 \rangle$, so a vector orthogonal to the plane through P , Q , and R is
$\overrightarrow{PQ} \times \overrightarrow{PR} = \langle (3)(1) - (-1)(-2), (1)(-2) - (-1)(1), (-1)(-1) - (3)(1) \rangle$
$= \langle 1, -1, -2 \rangle$ (or any scalar mutiple thereof).

(b) The area of the parallelogram determined by $\overrightarrow{PQ}$ and $\overrightarrow{PR}$ is $\left| \overrightarrow{PQ} \times \overrightarrow{PR} \right| =$
$|\langle 1, -1, -2 \rangle| = \sqrt{1^2 + (-1)^2 + (-2)^2} = \sqrt{6}$,
so the area of triangle PQR is $\frac{1}{2}\sqrt{6}$.