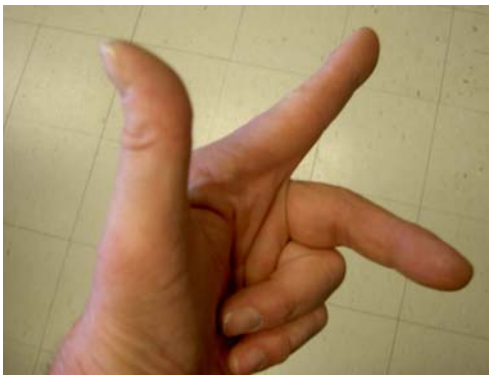
RIGHT HAND RULE

On the left is shown the correct way to hold your fingers out for a right hand rule. The thumb and forefinger are in a plane with the palm, at right angles to one another, and the middle finger is perpendicular to that plane.

Wrong!!! The thumb and forefinger are supposed to be in the plane of the palm, not the thumb and middle finger. This is absolutely, positively guaranteed to give you a wrong answer *every* time!



Wrong!!! This is your left hand, not your right hand. If you are right-handed it is all too easy when you are writing on your exam sheet to start using your left hand by accident. Be careful not to do that!

Do you have nicer-looking hands than those in these pictures? Volunteer to have them photographed. The instructor carries a digital camera with him. This is your chance for Physics 112 immortality!

THREE-FINGER RIGHT-HAND RULES

	Thumb	**Forefinger**	**Middle Finger**
1	Magnetic force on a wire	Electric current I	Magnetic Field $\vec{B}$
2	Magnetic force	Velocity $\vec{v}$ (positive charge)	Magnetic Field $\vec{B}$
3	Magnetic field $\vec{B}$	$\vec{c}$ (direction of propagation)	Electric field $\vec{E}$

Rule 1 is for determining the direction of the magnetic force on a current-carrying wire located in a region with a magnetic field due to some other source.

Rule 2 is for determining the direction of the magnetic force of an electric charge moving in a magnetic field. If the charge is negative, you should use $-\vec{v}$ instead of $\vec{v}$.

Rule 3 relates the directions, at any instant at any point in space, for the magnetic and electric fields associated with an electromagnetic wave. $\vec{c}$ is the velocity of propagation of the wave.

CURLED FINGERS RIGHT-HAND RULES

	Thumb	**Fingers curl in direction of:**
1	Electric current I along a wire	Magnetic field $\vec{B}$ near the wire
2	Magnetic field $\vec{B}$ (inside circuit)	Electric current I in the circuit
3	Magnetic field $\vec{B}_{\text{loop}}$ of circuit	Electric current I in the circuit

This right-hand rule is different. You point the thumb of your right hand in a certain direction, and let the other fingers of your hand curl in the natural direction.

Rule 1 is for determining the direction of the magnetic field $\vec{B}$ produced by a current-carrying wire near the wire. The wire may be part of a circuit. Make sure that for the electric current you use the direction that positive charges move.

Rule 2 is for determining the direction of the current in a circuit in which the magnetic flux is changing, so that a current is induced. First you need to determine the direction of the magnetic field $\vec{B}$ produced by the induced current in the circuit by the changing magnetic field, and from there you infer the direction of the induced current in the circuit.

Rule 3 allows you to determine the direction of the magnetic field $\vec{B}_{\text{loop}}$ of an electric circuit when you know the direction of the electric current in the circuit.