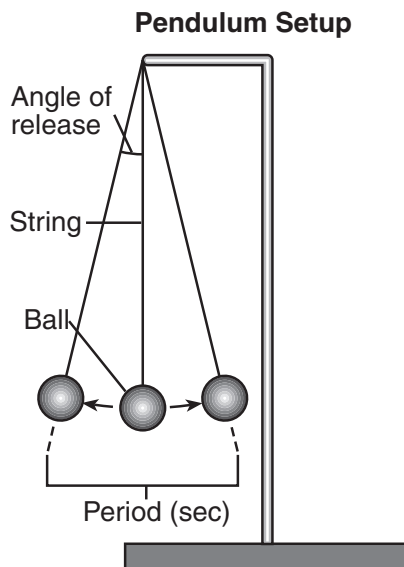Base your answers to questions 51 and 52 on the diagram and information below and on your knowledge of science. The diagram shows a ball hung on a string to create a pendulum. The pendulum's period and angle of release are shown. The period is the length of time, in seconds, for one complete swing of the pendulum.

Pendulum Setup

Three different investigations to determine the period of a swinging pendulum are described below.

• In investigation 1, the pendulum was released at different angles. The length of string and mass of the ball were the same for each angle.

• In investigation 2, different lengths of string were used. The angle of release and mass of the ball were the same for each length.

• In investigation 3, balls of different masses were used. The angle of release and length of string were the same for each mass.

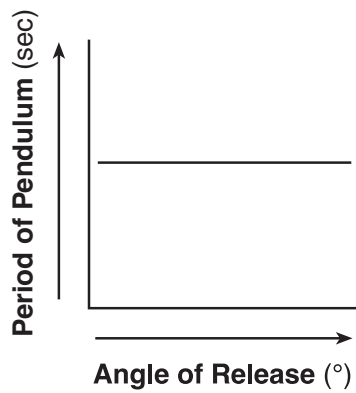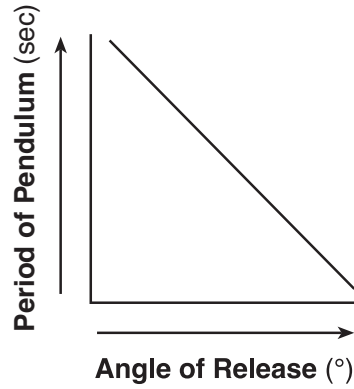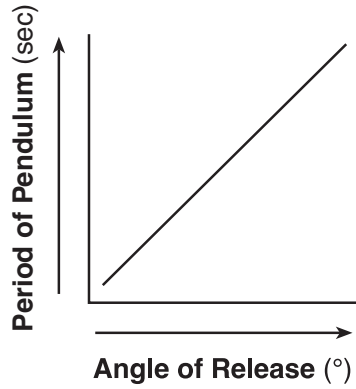The data tables below show the results of the three investigations.

Data Tables

Investigation 1		Investigation 2		Investigation 3	
Angle of Release (°)	Period (sec)	Length of String (cm)	Period (sec)	Mass of Ball (kg)	Period (sec)
20	1.3	135	2.4	8.0	1.2
17	1.3	104	2.1	7.0	1.2
15	1.3	98	2.0	5.0	1.2
13	1.3	69	1.7	2.0	1.2
10	1.3	34	1.3	1.0	1.2
5	1.3	29	1.2	0.2	1.2

51 Circle the graph below that best represents the relationship shown by the data in investigation 1.   [1]

Period of Pendulum (sec)

Angle of Release (°)

Period of Pendulum (sec)

Angle of Release (°)

Period of Pendulum (sec)

Angle of Release (°)

Period of Pendulum (sec)

Angle of Release (°)

52 Determine the most likely length of the string used in investigation 3 based on the data provided in investigation 2.   [1]

_____ **cm**

_____