Bathymetric Charts

Name:

Per: Date:

1.   How did the "fathom" measurement originate? Explain. *(1 pt)*

How many feet are in a fathom? *(½ pt)*

2.   What does an isobath (contour) line represent on a bathymetric chart? *(1 pt)*

3.   How can you tell from a bathymetric chart whether a slope is steep or not? *(2 pts)*

Echo sounding is used at sea to determine water depth. A sound transmitter mounted in the hull of a ship emits high frequency sound waves, which travel through the water and are reflected off the seafloor. A listening device called a hydrophone (also mounted in the ship's hull) detects the returning echoes and generates a bathymetric profile of the sea bottom. The speed (velocity = v) of the sound traveling through water is about 1460 meters per sec (m/s). Using this information, write a simple equation that you can use to calculate the water depth below the ship. Hint: you are looking for the depth (**d**), and you know the velocity (**v**) of sound in water, as well as the travel time (**t**) of the sound from the boat to the bottom and back (as indicated in the diagram).
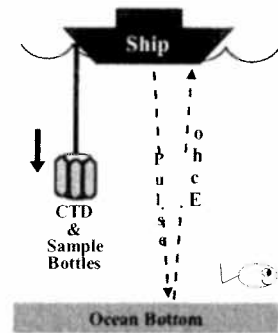
4.   Formula: *(1 pt)*

> I will give you the formula, but you will lose 1 point.

Now, using the equation you developed, calculate the depth when the time for the sound to leave the boat and bounce back to the hydrophone is: *(4 pts)* **Show all calculations for full credit!**
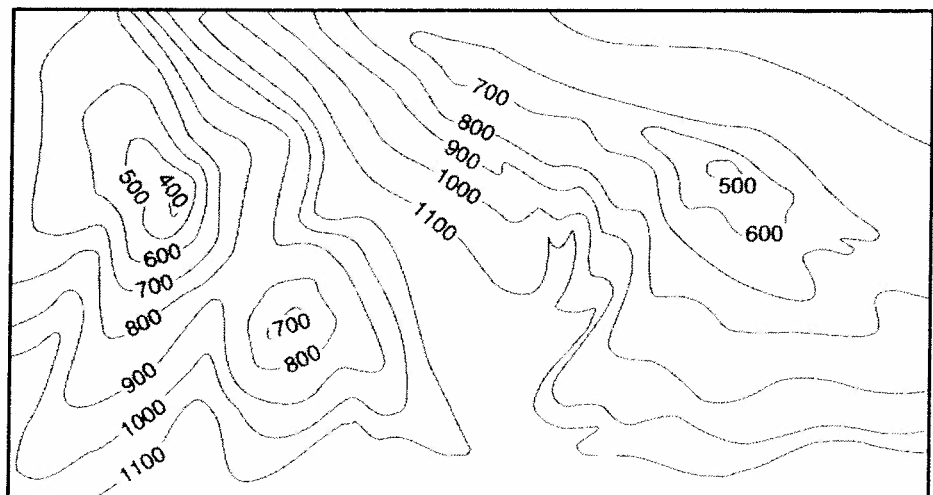
t = 2 seconds

t = 4 seconds

5.   On the diagram at right, identify and label *(2.5 pts)*

- Steep-slope
- Gentle-slope
- Submarine canyon
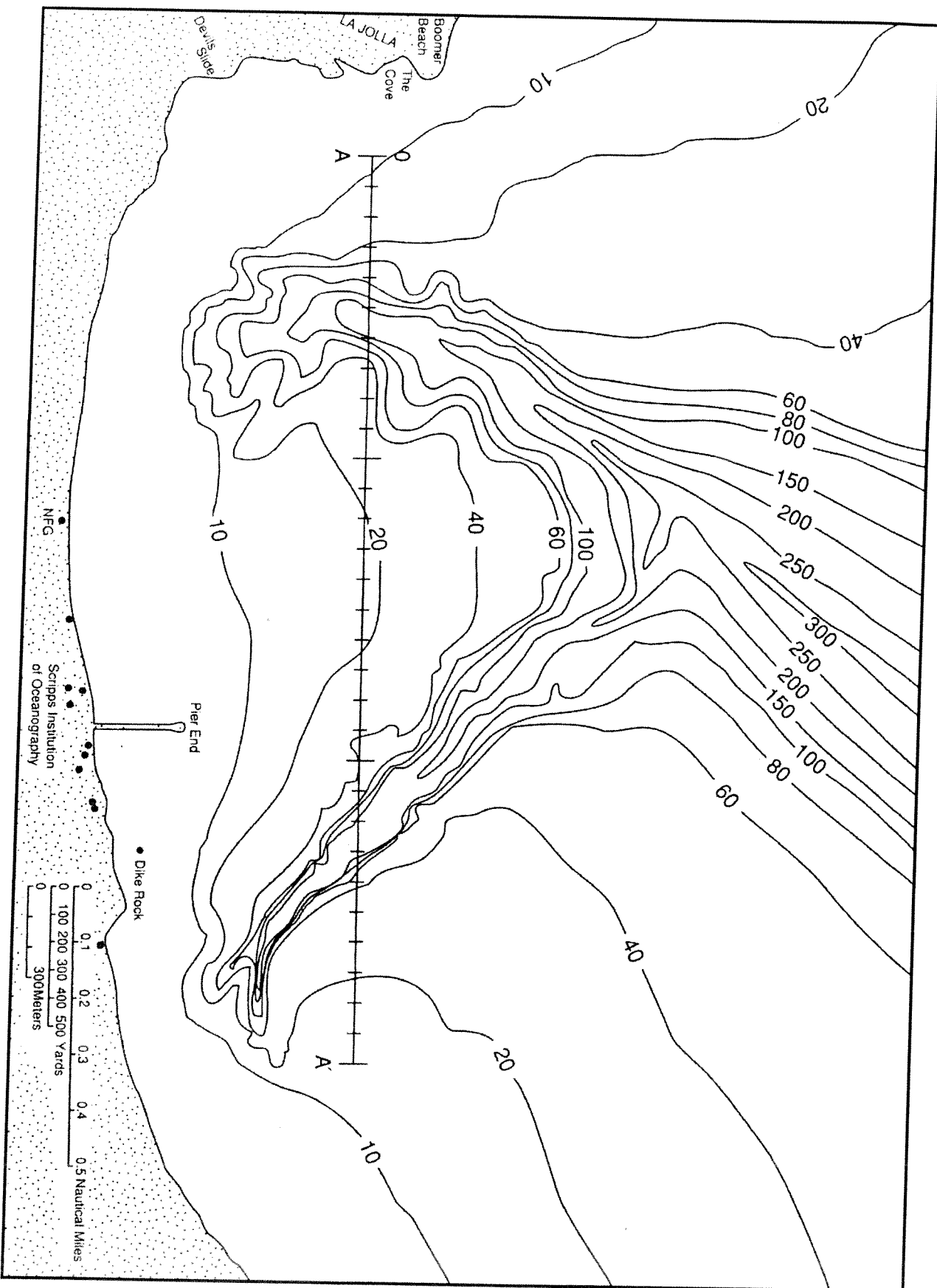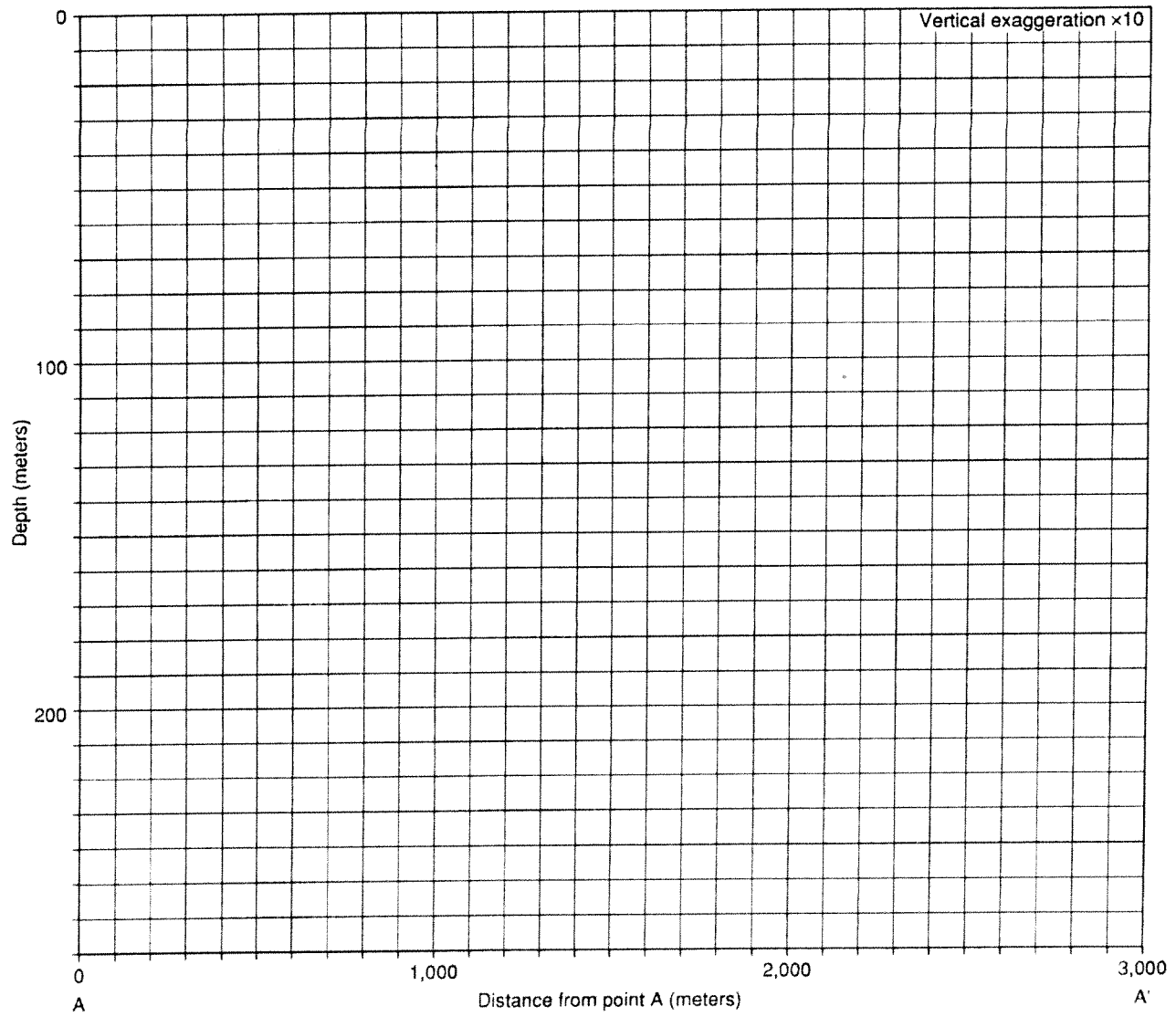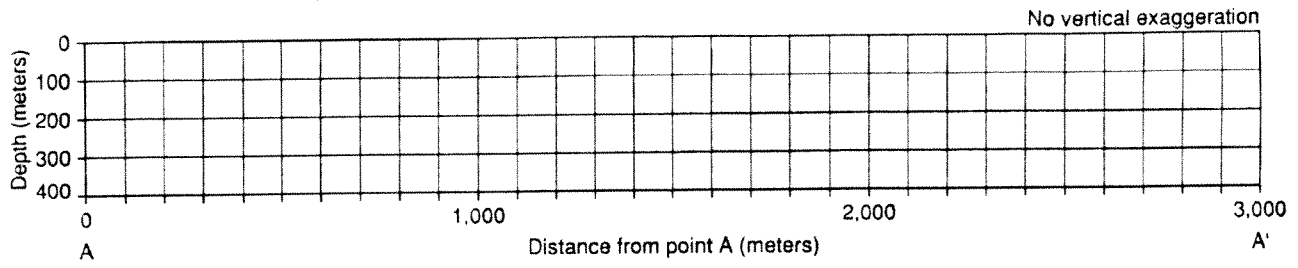- Seamount
- NW-trending ridge

Draw a topographic profile (cross section) showing the shape of the ocean bathymetry at La Jolla, San Diego along line A-A'. The line is 3 km long, marked off in 100 m intervals. Start by tabulating depth (m) as a function of distance in the table below. Then draw the profile on the graph paper provided. Draw the profile **with no** vertical exaggeration and with a vertical exaggeration of 10x.

Distance from A (m)	Depth (meters)	Distance from A (m)	Depth (meters)
0		1600	
100		1700	
200		1800	
300		1900	
400		2000	
500		2100	
600		2200	
700		2300	
800		2400	
900		2500	
1000		2600	
1100		2700	
1200		2800	
1300		2900	
1400		3000	
1500			

Answer the following questions after completing both profiles.

6. Color in the 150 m to 200 m contour line on the chart of La Jolla, San Diego. Use any color. *(1 pt)*

7. What are the three contour intervals used on the chart of La Jolla, San Diego? *(1 ½ pts)*

    a.   b.   c.

8. Name the primary geological feature off the shoreline of La Jolla. **Hint:** look at the profile. *(2 pts)*

9. What is the length (meters) of the Scripps Institute of Oceanography pier? *(2 pts)*

10. Compare and contrast the two profiles. Explain why vertical exaggeration is used when drawing profiles. *(1 ½ pts)*

Devils Slide

LA JOLLA

Boomer Beach

The Cove

A

10

20

40

NFG

Scripps Institution of Oceanography

Pier End

Dike Rock

A'

0
100 200 300 400 500 Yards
0 0.1 0.2 0.3 0.4 0.5 Nautical Miles
0 300 Meters

10

20

40

60

80

100

150

200

250

300

250

200

150

100

80

60

40

20

10

0

10

20

40

60

100

60

40

20

10

No vertical exaggeration

Depth (meters)

0
100
200
300
400

0
1,000
2,000
3,000

Distance from point A (meters)

A
A'

Vertical exaggeration ×10

0

Depth (meters)

100

200

0
1,000
2,000
3,000

Distance from point A (meters)

A
A'

4 pts