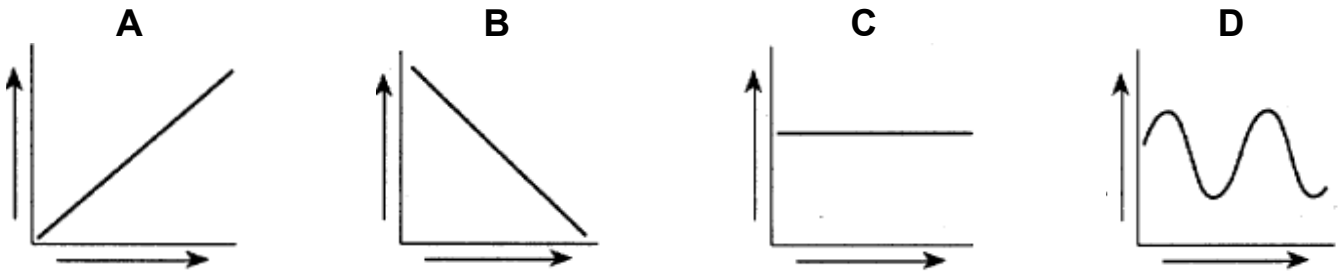
Name: Answer Key
Earth Science

Date:
Period:

Earth Science Regents Review Workbook

Part 1: Prologue & Earth's Dimensions

Graphing



1. Identify the relationship shown in each graph above:

   A. Direct

   B. Indirect

   C. Static

   D. Cyclic

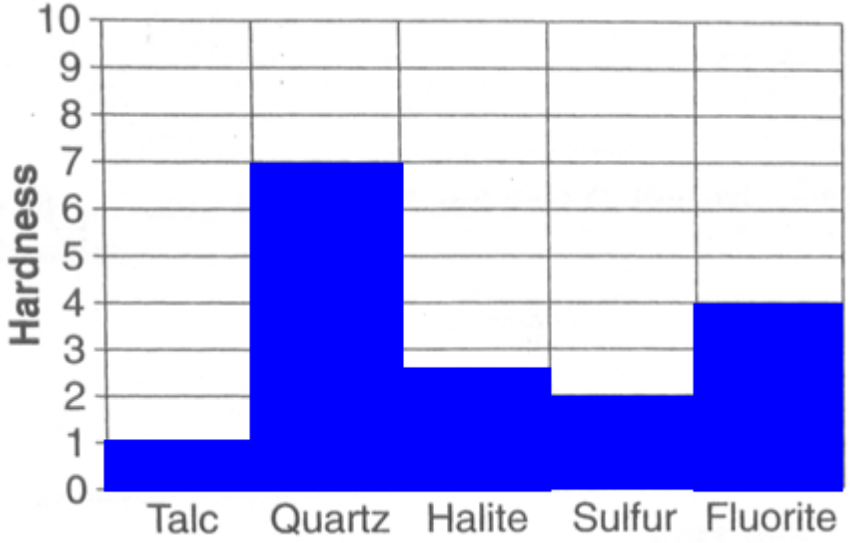
2. Provide two examples in nature that when plotted on a grid would have a similar graph to D.

   1. Phases of the Moon

   2. Ocean tides

3. Base your answer to the following question on the hardness of the minerals talc (1), quartz (7), halite (2.5), sulfur (2), and fluorite(4).

   On the grid below, construct a bar graph to represent the hardness of these minerals.



Graphing 2

Base your answers to questions 1 through 3 on the data table below, which shows the average carbon dioxide (CO_2) concentrations in Earth's atmosphere for specific years from 1930 to 2010. Carbon dioxide is a greenhouse gas in Earth's atmosphere that contributes to global warming. The average carbon dioxide concentrations were measured in parts per million (ppm).

1. On the grid below, construct a line graph by plotting the average carbon dioxide concentrations in Earth's atmosphere for each year shown on the data table. Connect the plots with a line.

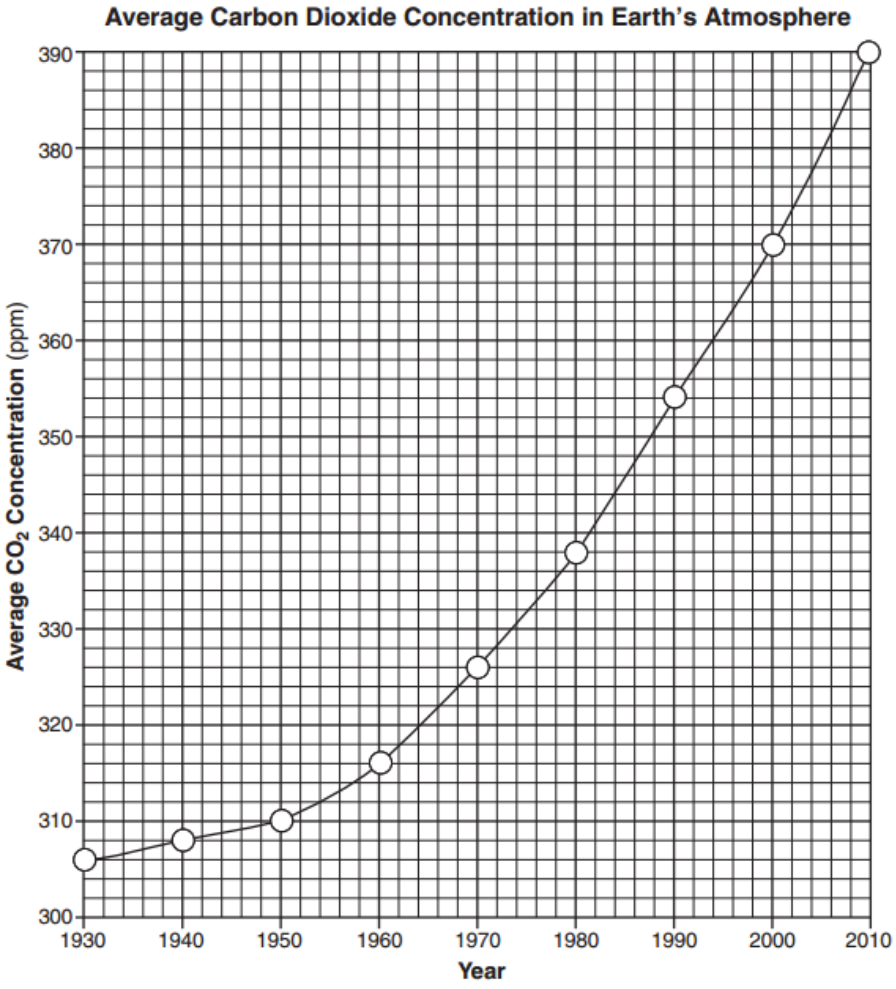
2. Identify the relationship as depicted on the graph between the average CO_2 concentration (ppm) and time.
   Direct relationship. As time increased, average carbon dioxide concentration increased.

3. Calculate the rate of change from 2000 to 2010 of the average carbon dioxide concentrations, in parts per million per year. Show your work.

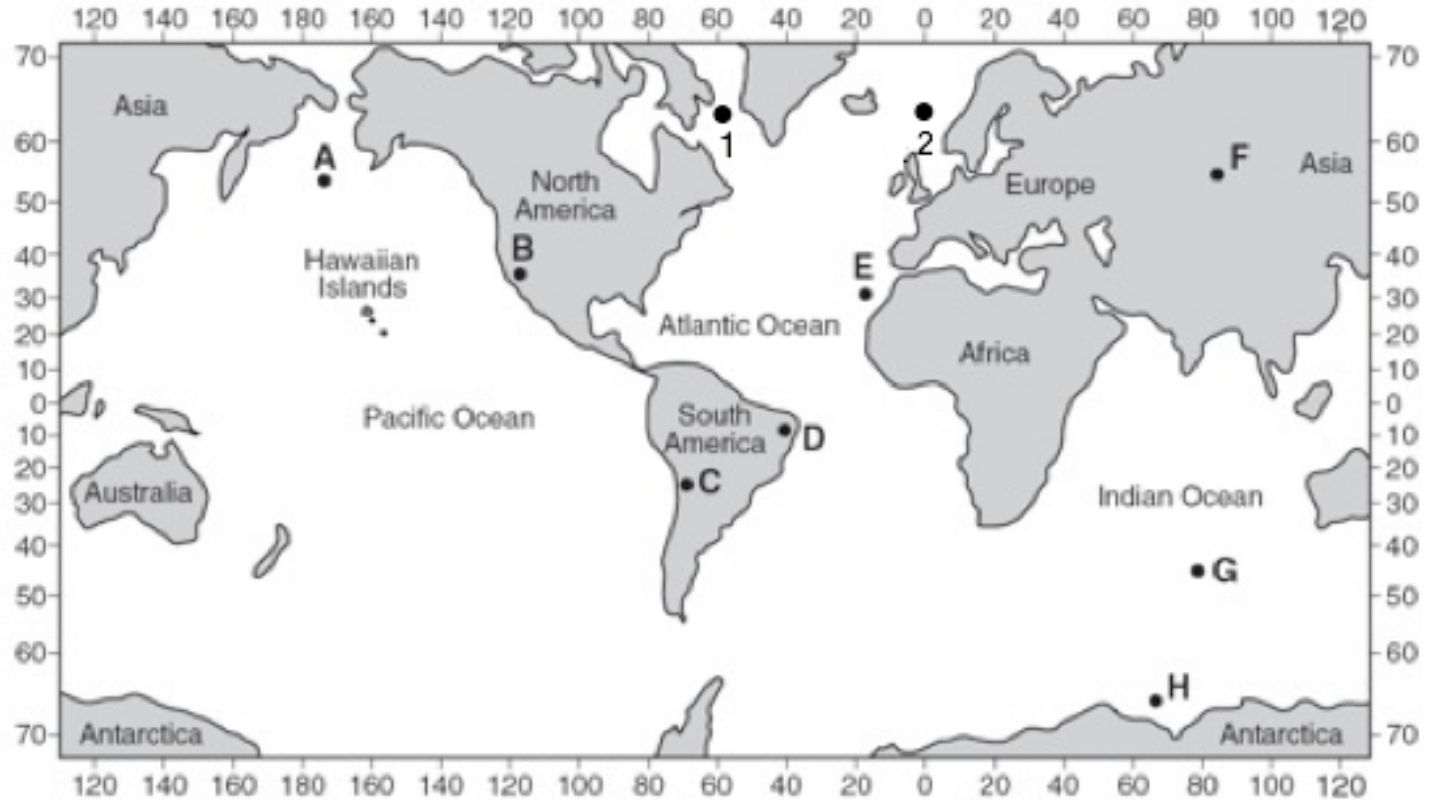
   Rate of change = $\frac{\text{change in value}}{\text{time}} = \frac{390 - 370 \text{ ppm}}{10 \text{ years}} = 2 \text{ ppm/year}$

Average Carbon Dioxide Concentrations in Earth's Atmosphere

Year	Average CO_2 Concentration (ppm)
1930	306
1940	308
1950	310
1960	316
1970	326
1980	338
1990	354
2000	370
2010	390



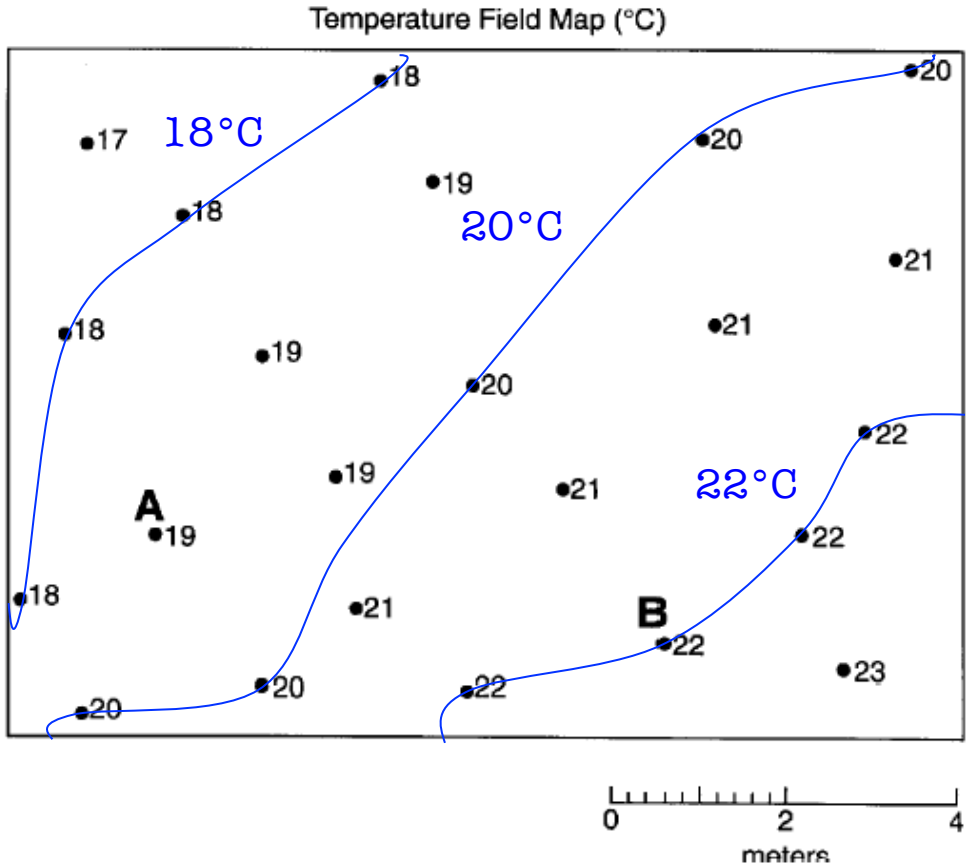
Latitude and Longitude



1. Determine the latitude and longitude of the following points (include unit and direction):
   a. Point B: 35°N, 115°W
   b. Point C: 25°S, 70°W
   c. Point G: 45°S, 75°E
2. How many degrees separate each time zone? 15°
3. As you go east, time does increase.
4. As you go west, time does get less.
5. If it is 6:00 am at Point 1, what time is it at point 2? 10 a.m.
6. If the altitude of Polaris of an observer is 42˚, what it the observer's latitude? 42°N
7. If your latitude is 61˚ North, what is the altitude of Polaris? 61°
8. What is the altitude of Polaris if your latitude is 41˚ South? Can't see Polaris in S. Hemisphere
9. Which latitude gets the most direct Sun on June 21? 23.5°N (Tropic of Cancer)
10. Which latitude gets the most direct Sun on September 23? 0°
11. Which latitude gets the most direct Sun on December 21? 23.5°S (Tropic of Capricorn)
12. Which latitude gets the most direct Sun on March 21? 0°

Isolines

Base your answers to the questions below on the temperature field map below. The map shows temperature readings (°C) recorded by students in a science classroom. The readings were taken at the same time at floor level. Temperature readings for points A and B are labeled on the map.

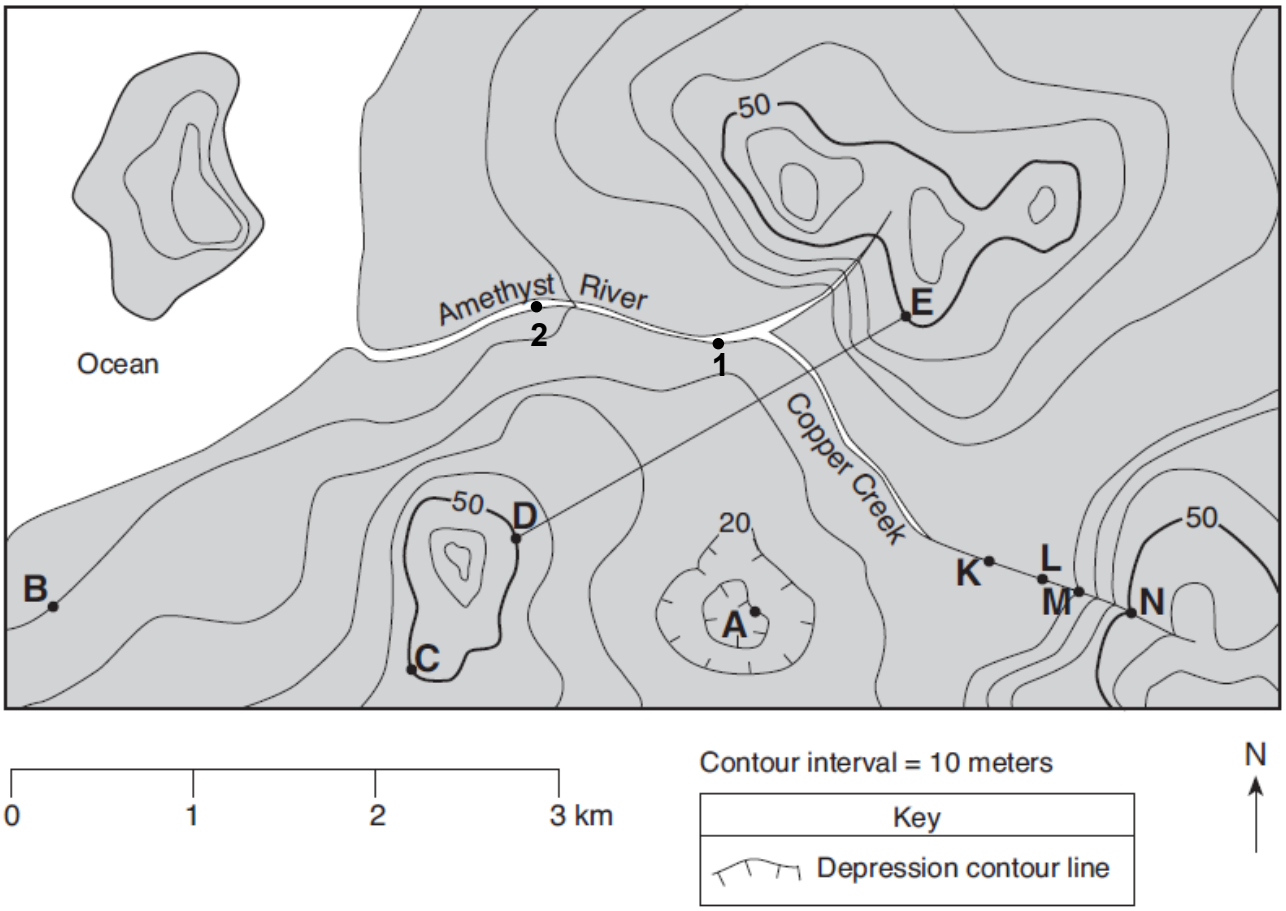


1. On the temperature field map, use solid lines to draw the 18°C, 20°C, and 22°C isotherms. Isotherms must extend to the boundary of the map. Label each isotherm to indicate its temperature.

2. Determine the temperature gradient from point A to point B by following the directions below.
   a. Write the equation used to determine the gradient.
   b. Substitute values from the field map into the equation.
   c. Solve the equation and label the answer with the proper units.

$$\text{Gradient} = \frac{\text{change in field value}}{\text{distance}} = \frac{22°C - 19°C}{6\ m} = \frac{3°C}{6\ m} = 0.5°C/m$$

Topographic Maps



1. How do you know Copper Creek is flowing faster between points N&M, than between points L&K?

   There are more lines closer together between N&M so it is steeper than between L&K.

2. What is the elevation for point A? 10 m

3. What is the highest possible elevation for the island in the NW corner of the map? 29 m

4. What is the distance between points D & E? 2.5 km

5. Calculate the gradient between points B & C. Show your work.

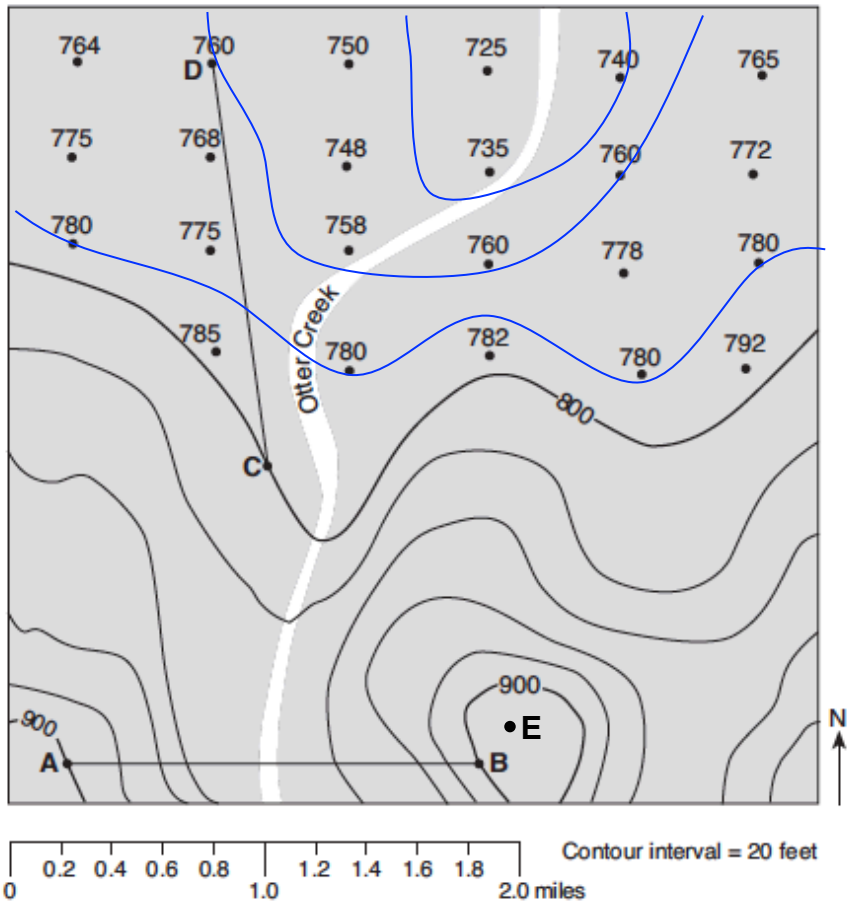
   $$\text{Gradient} = \frac{\text{change in field value}}{\text{distance}} = \frac{50 - 10 \text{ m}}{2 \text{ km}} = \frac{40 \text{ m}}{2 \text{ km}} = 20 \text{ m/km}$$

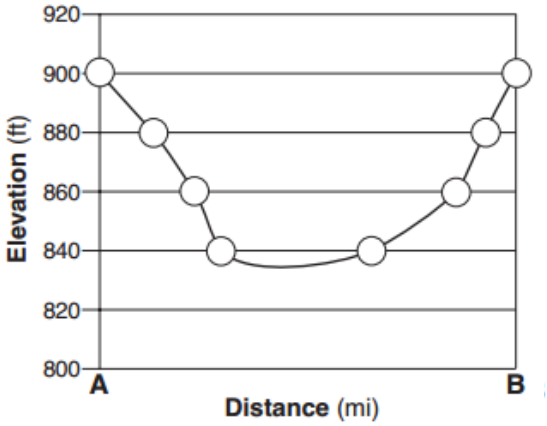
6. A student placed a floating wooden block in Amethyst River at location 1. Ten minutes later, the floating block arrived at location 2. What was the creek's rate of flow from location 1 to location 2? Express your answer to the nearest tenth.

   $$\text{Rate} = \frac{\text{change in value}}{\text{time}} = \frac{1 \text{ km}}{10 \text{ min}} = 0.1 \text{ km/min}$$

Topographic Maps 2

Base your answers to questions 1 through 4 on the map below, which shows elevations in feet at various points. The southern part of the map has contour lines representing elevations at 20-foot intervals. Lines AB and CD are reference lines on the map.





1. On the map above, draw contour lines for the 780-ft, 760-ft, and 740-ft elevations. Extend your contour lines to the edges of the map.

2. On the grid above, construct a topographic profile along line AB by plotting the elevation of *each* contour line that crosses line AB. Connect the plots with a line to complete the profile.

3. Calculate the gradient along line CD and label your answer with the correct units.
   a. Write the equation for gradient.
   b. Substitute the correct values into the equation.
   c. Calculate the gradient and label your answers with correct units.

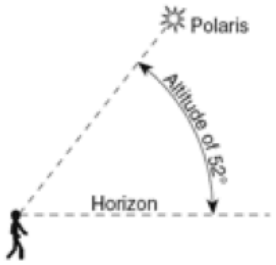
$$\text{Gradient} = \frac{\text{change in field value}}{\text{distance}} = \frac{800 - 760 \text{ ft}}{1.6 \text{ miles}} = 25 \text{ feet/mile}$$

4. What is the lowest possible elevation of point E? 901 feet

5. Explain how the contour lines indicate the direction of flow of Otter Creek.

The contour lines bend upstream so Otter Creek is flowing north/northeast.

Altitude of Polaris



1. What is the latitude of the observer? 52°N

2. Can you see Polaris in the Southern Hemisphere? No!

3. What is the point directly above the observer called? Zenith

4. a. As latitude increases, what happens to the altitude of Polaris? Altitude of Polaris also increases

   b. What type of relationship is this called? Direct

5. If you travel from Binghamton, NY to Jamestown, NY, what happens to the altitude of Polaris?

   Altitude of Polaris remains the same because Binghamton & Jamestown are at the same latitude.