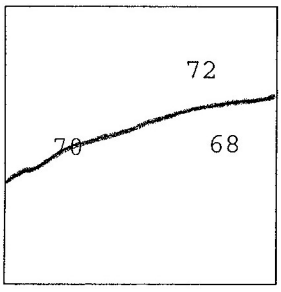
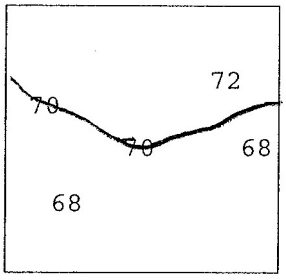
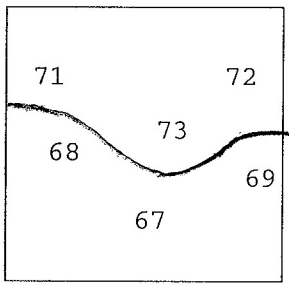
6: Multivariable Functions and Contour Diagrams -- Answers

1. Multivariable Function
2. For example, someone's body mass index (BMI) is determined using a multivariable function where the person's height and weight are the inputs.
3. $f(1,2)$ is the output of the function f that has two inputs, 1 for x and 2 for y. $f(1,2) = 5$.
4.
   a) ≈ 0.044 cubic miles
   b) ≈ 25.6 miles
5. $V(3,h) = 3\pi h$. This is the formula for the volume of a cone of radius 3.
6. \$382.45
7. \$456.53. Thus you pay \$74.08 more per month, but finish one year sooner.
8. $M(i,2300) = \dfrac{2300i}{1-(1+i)^{-60}}$. This formula can be used to find the monthly payment on a 5 year loan of \$2300, where i is the monthly interest rate.
9. \$12,043.34 to \$14,452.00.
10. –22°
11. The wind chill for 25 mph wind speeds and temperature t.
12. 35 mph
13. Make one of the inputs a constant value.
14.
   a) $C(l,d) = 55l + 65d$, where l is the number of lunch passes, d is the number of dinner passes.
   b) The commuter pass would be cheaper.
15. Contour curves are commonly used in topographical maps and weather maps.
16.
   a) The inputs are age and the value of the insurance plan. The output is the annual payment.
   b) The \$150,000 plan.
   c) The \$200,000 plan.
   d) The payments are cheaper when you're younger. However, you should only buy insurance when it is needed. If you are young and have no dependents, there is probably not much of a reason to buy life insurance.
17. There is a small slope at point A, a steep slope at point B, and at point C it is flattening out with only a slight slope.
18.
   a) 

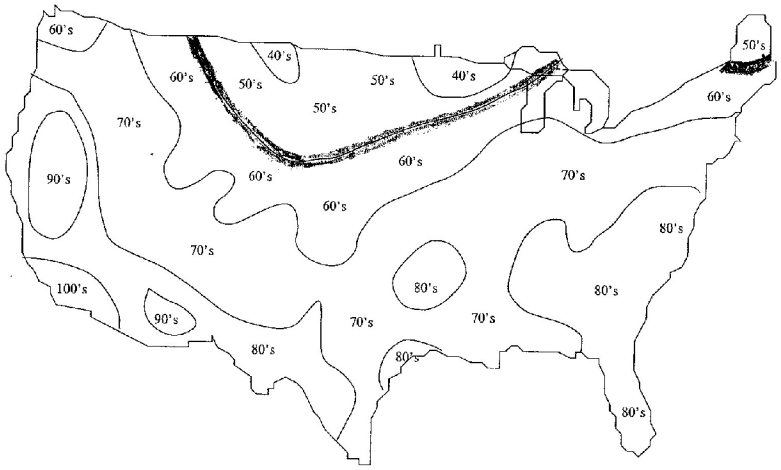
   b) 

   c) 

19.

a) 70°

b)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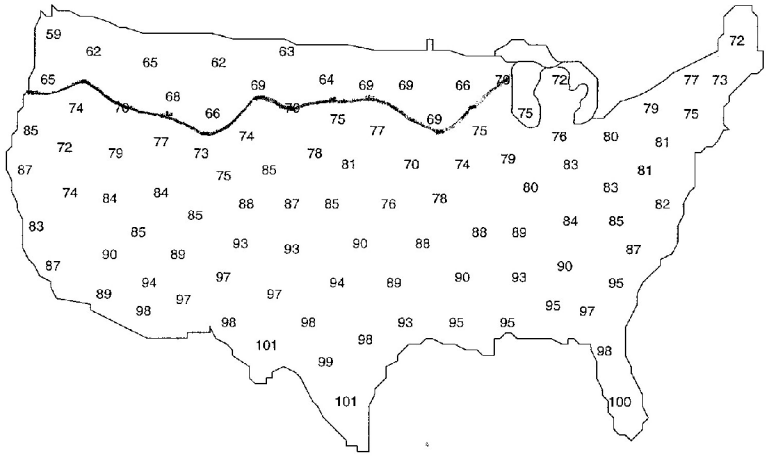
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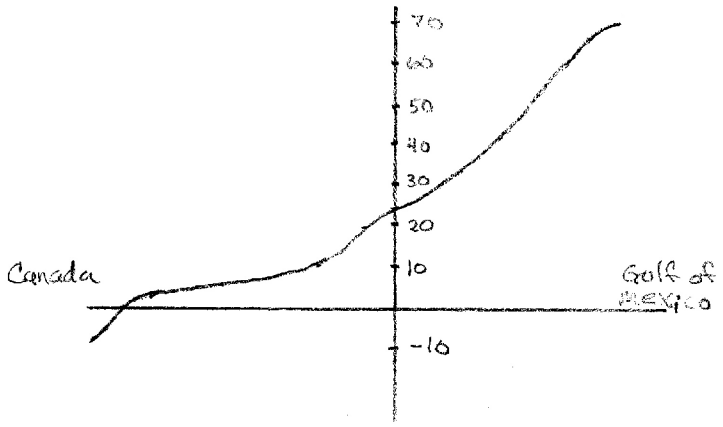
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Canada
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