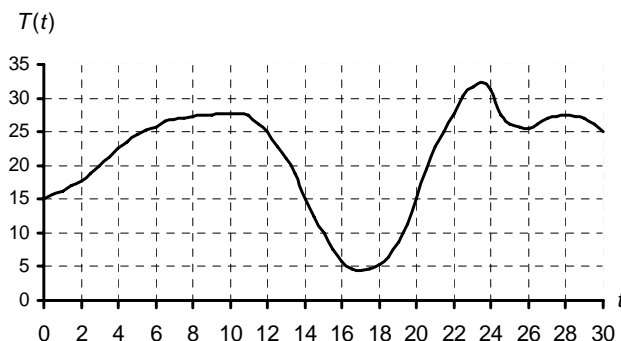


Use proper notation and show all work for full credit. Attach this sheet to the front of your work. Neatness and completeness of answers/ solutions are important.

1. A graph of the temperature of a particular solution in an experiment is shown at the right. Time, t , is measured in hours since the start of the experiment. Use the graph to answer the following questions. Include proper notation.



A. Find $T(14)$. Give a practical interpretation.

B. Find the interval(s) where the temperature is increasing. Use proper notation

C. Find the domain and range of the graph.

D. Find the average rate of change over $[12, 20]$. Give a practical interpretation of your answer.

E. Find t so that $T(t) = 15$.

F. The temperature of a solution in another experiment is given by $T_2(t) = 2T(t) + 10$. What is the temperature of the solution 15 hours after the start of that experiment?

2. Find the domain and range of $y = \left| \frac{9 - x^2}{x + 3} \right|$. Include a detailed sketch of the graph.

3. Find the value(s) of k so that the following is true for $g(t) = \frac{2t^2 + k}{3t + 1}$.

A. $g(1) = 5$

B. $g(3) = 0$

C. The graph of $g(t)$ has no zeros.

4. A. Write a function for the top half of a circle centered at the origin with radius 3.

B. Find the average rate of change over $[-1, 2]$.

C. Find an interval where the average rate of change is positive.

D. Write out the difference quotient $\frac{f(x+h) - f(x)}{h}$ for your function in part A. Do not simplify.

5. The graph of $f(x) = \sqrt[3]{x}$ and $g(x) = \frac{x}{2}$ are shown at the right.

A. Find the exact coordinates so that $f(x) = g(x)$. Label them on the graph.

B. Find the coordinates of P , Q , and R if the x coordinate of R is $3/2$. Give exact values.

