1. a) when the yam has been in the oven for 10 minutes, its temp is 85°
   b) \( f'(t) = \frac{df}{dt} \) degrees per minute
      positive: the temp increases as time in the oven increases
      c) \( f'(20) = 2 \) units/minute, the temp increase by 2° per minute

2. a) \( f(200) = 70 \) quarts, \$70 = cost of producing 200 quarts
      b) \( f'(200) = 3 \) quarts/dollar

3. \( \frac{dw}{dt} = \text{gallons} \)
   units \( \Rightarrow \) gallons per minute
   rate the water is filling/drainage the tub at time \( t \)

4. a) \( \frac{dw}{dt} = \text{weight} \)
    negative: weight decreases as time increases (burns longer)
    b) \( \frac{dw}{dt} = 0 \)

5. a) \( f(17) = 45 \) workers \( \Rightarrow \) items produced
    b) \( \frac{d[i]}{dt} = \text{items per worker} \Rightarrow \) items per worker

6. a) \( f(4) = 3480 \) \text{years per students} students
    b) \( f'(7) = -469 \)
    c) \( f''(20) = -6 \) students per year

7. a) \( s(t) = 3t^3 - 45t^2 + 189t - 16 \) \( s(0) = -16 \)
    b) \( v(t) = 9t^2 - 90t + 189 \) \( v(0) = 189 \)
    c) \( a(t) = 18t - 90 \) \( a(0) = -90 \)

8. \( 9(t^2 - 10t + 21) = 0 \)
   \( (t-3)(t-7) \)
   \( t = 3, 7 \)

9. \( 18t - 90 = 0 \)
   \( t = 5 \)

10. \( \text{speed inc} (3.5) \text{u}(7.16) \)
    \( \text{speed dec} (0.3) \text{u}(5.7) \)

11. \( s(16) - s(0) \)

12. \( 582 \)