Write and solve the differential equation that models the verbal statement

1) The rate of change of y with respect to t is directly proportional to the square root of t.

2) The rate of change of P with respect to t is inversely proportional to the square of t.

3) The rate of change of y with respect to t is proportional to y.

4) The rate of change of N with respect to t is inversely proportional to t.

5) The rate of change of y with respect to t is proportional to the square of t.

Write and solve the differential equation that models the verbal statement. Evaluate the solution at the specified value.

6) The rate of change of y is proportional to y. When x = 0, y = 1/2 and when x = 5, y = 5. What is the value of y when x = 10?

7) The rate of change of y is proportional to y. When x = 0, y = 6 and when x = 4 y = 15. What is the value of y when x = 8?

Find the exponential function, y = a(b)^t that passes through the two given points.

8)   (0, 3) and (4, 48)   9)   (1, 6) and (4, 16/9)

Answers

1) $y = \dfrac{2k}{3}t^{3/2} + C, y = kt^{3/2} + C$	6) 50
2) $P = \dfrac{-k}{t} + C, P = \dfrac{k}{t} + C$	7) 75/2
3) $y = Ce^{kt}$	8) $y = 3(2)^t$
4) $N = k \ln |t| + C$	
5) $y = \dfrac{k}{3}t^3 + C, y = kt^3 + C$	9) $y = 9\left(\dfrac{2}{3}\right)^t$