

- ① FIND THE FUNCTION  $f$  WITH  $f'(x) = \frac{4x+3}{x^2}$  FOR  $x > 0$  WHOSE GRAPH PASSES THROUGH THE POINT  $(1, 5)$ .
- ② FIND  $\int \frac{24x^2}{(x^3+1)^3} dx$ .
- ③ FIND  $\int \frac{5x-20}{x^2-8x+2} dx$ .
- ④ FIND  $\int \frac{12}{\sqrt{x}(\sqrt{x}+5)^4} dx$ .
- ⑤ FIND  $\int \frac{15e^{2x}}{\sqrt{3e^{2x}+4}} dx$ .
- ⑥ IF  $f(x) = x(\ln x)^2$ , FIND THE RELATIVE EXTREMA FOR  $f$ .
- ⑦ TAMMY WANTS TO INVEST \$1,000 IN A BANK ACCOUNT. IF U.S. BANK OFFERS AN ANNUAL RATE OF 6% COMPOUNDED CONTINUOUSLY, WHAT ANNUAL RATE  $r$  COMPOUNDED MONTHLY WOULD WELLS FARGO HAVE TO OFFER SO THAT TAMMY WOULD HAVE THE SAME AMOUNT OF MONEY AFTER 5 YEARS?
- ⑧ IF  $y = (2x)^{\sqrt{x}}(\ln x)^x$ , FIND  $\frac{dy}{dx}$ .
- ⑨ A BACTERIAL CULTURE WHICH IS GROWING EXPONENTIALLY INCREASES FROM 7 mg TO 8 mg IN 5 HOURS. HOW LONG DOES THE CULTURE TAKE TO INCREASE BY 40%?
- ⑩ A ROCK IS THROWN STRAIGHT UP FROM A POINT 4 FT ABOVE THE SURFACE OF THE MOON WITH AN INITIAL VELOCITY OF 15 FT/SEC. IF THE ACCELERATION DUE TO GRAVITY ON THE MOON IS  $-5$  FT/SEC<sup>2</sup>, FIND THE VELOCITY OF THE ROCK WHEN IT HITS THE SURFACE OF THE MOON (USING INTEGRATION).
- ⑪ A CUP OF TEA WITH A TEMPERATURE OF 170° IS PLACED IN A ROOM WITH A TEMPERATURE OF 70°. IF THE TEA HAS A TEMPERATURE OF 150° AFTER 5 MINUTES, FIND WHEN ITS TEMPERATURE WILL BE 130° (USING NEWTON'S LAW OF COOLING).
- ⑫ FIND  $\int \frac{\sin \theta}{\sin \theta + \cos \theta} d\theta$ .