SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the indicated integral. Check your answers by differentiation.

1) $\int \sqrt{t}\, dt$ 1) _____

2) $\int (x^{1/3} - 4x^{-2/3} + 4)\, dx$ 2) _____

3) $\int \left(9e^u + \dfrac{9}{u} + \ln 5 \right) du$ 3) _____

4) $\int e^{0.01t}(e^{0.14t} + 7)\, dt$ 4) _____

Solve the given initial value problem for $y = f(x)$.

5) $\dfrac{dy}{dx} = 3x - 5$ where $y = 3$ when $x = -1$ 5) _____

6) $\dfrac{dy}{dx} = \dfrac{6}{x} - \dfrac{1}{x^2}$ where $y = -5$ when $x = 1$ 6) _____

The slope $f'(x)$ at each point (x, y) on a curve $y = f(x)$ is given along with a particular point (a, b) on the curve. Use this information to find $f(x)$.

7) $f'(x) = 9x^2 - 8x + 2$; $(0, 7)$ 7) _____

8) $f'(x) = e^{-x} + x^7$; $(0, -9)$ 8) _____

Solve the problem.

9) A manufacturer estimates that the marginal cost of producing q units of a certain commodity is $C'(q) = 3q^2 - 12q + 12$ dollars per unit. If the cost of producing 10 units is \$2000, what is the cost of producing 20 units?   9) _____

10) Suppose the consumption function for a particular country is $c(x)$, where x is national disposable income. Then the marginal propensity to consume is $c'(x)$. Suppose x and c are both measured in billions of dollars and

$$c'(x) = 0.8 + 0.3\sqrt{x}$$

If consumption is 14 billion dollars when $x = 0$, find $c(x)$.   10) _____

Find the indicated integral.

11) $\int e^{3x-5}\, dx$

12) $\int \sqrt{8x+4}\, dx$

12) _____

13) $\int 2xe^{x^2+2}\, dx$

13) _____

14) $\int \frac{y^7}{(y^8+5)^2}\, dy$

14) _____

15) $\int \frac{1}{x\ln x}\, dx$

15) _____

Evaluate the given definite integral using the fundamental theorem of calculus.

16) $\int_{-3}^{3} (8x-3)\, dx$

16) _____

17) $\int_{0}^{1} e^{-x}(2 - e^x)\, dx$

17) _____

18) $\int_{2}^{3} (2x-5)^4\, dx$

18) _____

19) $\int_{1/6}^{1/4} \frac{e^{1/x}}{x^2}\, dx$

19) _____

Solve the problem.

20) A study indicates that t months from now the population of a certain town will be growing at the rate of $P'(t) = 6 + 5t^{2/3}$ people per month. By how much will the population of the town increase over the next 6 months?

20) _____

1) $\dfrac{2t^{3/2}}{3} + C$

2) $\dfrac{3x^{4/3}}{4} - 12x^{1/3} + 4x + C$

3) $9e^u + 9 \ln |u| + (\ln 5)u + C$

4) $-\dfrac{20}{3}e^{-0.15t} - 700e^{0.01t} + C$

5) $y = \dfrac{3}{2}x^2 - 5x - \dfrac{7}{2}$

6) $y = \ln x^6 + \dfrac{1}{x} - 6$

7) $f(x) = 3x^3 - 4x^2 + 2x + 7$

8) $f(x) = -e^{-x} + \dfrac{x^8}{8} - 8$

9) $7320

10) $c(x) = 0.8x + 0.2x^{3/2} + 14$

11) $\dfrac{1}{3}e^{3x-5} + C$

12) $\dfrac{1}{12}(8x + 4)^{3/2} + C$

13) $e^{x^2 + 2} + C$

14) $\dfrac{-1}{8(y^8 + 5)} + C$

15) $\ln |\ln x| + C$

16) -18

17) $1 - \dfrac{2}{e}$

18) 0.2

19) $e^6 - e^4$

20) About 95 people