7 Math101 answers

7.1 Yes.

7.2 No.

7.3 The answer is $F(x) = \frac{3}{2}x^2 - 7x + \frac{25}{2}$.

7.4 The answers are:
$$\frac{1}{3}, \qquad\qquad 0, \qquad\qquad 2\ln 2.$$

7.5 The answers are:
$$\frac{1}{2}x^2 - x + c, \qquad \frac{1}{3}x^3 + e^x + c, \qquad -2\cos(x) + c.$$

7.6 The answers are:
$$0, \qquad\qquad e^2 - e^{-1}, \qquad\qquad -2.$$

7.7 The answers are:
$$-x^{-1} - \frac{1}{3}e^{3x} + c, \qquad\qquad e^x - 2\ln(|x|) + c$$

7.8 The answers are:
$$\frac{e^2 - 1}{2}, \qquad\qquad \frac{124}{3}, \qquad\qquad \cos(-1) - \frac{3}{2}.$$

7.9 We have that $F'(x) = \frac{5}{7} \cdot \frac{14}{5}x^{\frac{9}{5}} = 2x^{\frac{9}{5}} = f(x)$.

7.10 The answers are:
$$x^3 + x^2 + c, \qquad \frac{1}{2}e^{6x} - 3\sin(x) + c, \qquad x\ln(x) - x - 2x^{\frac{1}{2}} + c.$$

7.11 The answers are:
$$2\ln(|x|) + 2x^{\frac{3}{2}} + 2x^2 + c, \qquad \frac{10}{11}x^{\frac{11}{8}} - \frac{1}{3}x^3 + c, \qquad c.$$

7.12 The answer is $\frac{2}{3}$.

7.13 We have that
$$-\int_b^a f(x)\,dx = -(F(a) - F(b)) = F(b) - F(a) = \int_a^b f(x)\,dx.$$

7.14 We have that
$$\int_a^c f(x)\,dx + \int_c^b f(x)\,dx = F(c) - F(a) + F(b) - F(c) = F(b) - F(a) = \int_a^b f(x)\,dx.$$