

1. a) $F'(t) = \frac{3^{t+1} - 2^{t+1}}{t+1}$

b) $F'(t) = 2t \ln(t^2(t^2 + 1)) - \ln(2t^2) + 2 \arctan(t) - \frac{\pi}{2}$

2. $\frac{32}{3}$

3. $\frac{52}{9}$

4. $\frac{e^4}{12} - \frac{e}{3} + \frac{1}{4}$

5. $F'(0) = -1$

6. $F'(2) = 2$

7. $\int_0^1 \left(\int_{-\sqrt{y}}^{\sqrt{y}} f(x, y) dx \right) dy$

8. $I = \ln(2)$

9. a) V b) F c) F d) F e) V f) V

10. $F'(t) = -\frac{3 \sin(\cos(t^{3/2}))}{2t}$

11. $F'(1) = \frac{e}{3}$

12. $\frac{64}{15}$

13. 6

14. $\frac{1}{7}$

15. a) $\int_0^1 \left(\int_1^{e^y} f(x, y) dx \right) dy = \int_1^e \left(\int_{\ln(x)}^1 f(x, y) dy \right) dx$

b) $\int_0^{\sqrt{2}} \left(\int_{x^2/2}^{\sqrt{3-x^2}} f(x, y) dy \right) dx = \int_0^1 \left(\int_0^{\sqrt{2y}} f(x, y) dx \right) dy + \int_1^{\sqrt{3}} \left(\int_0^{\sqrt{3-y^2}} f(x, y) dx \right) dy$

16. $\frac{143}{120}$