MATH152, 501–506, Spring 2011, Answers for the sample problems for the Final

1. $\frac{1}{3}$

2. $\frac{38\pi}{15}$

3. (a) $\frac{15\pi}{2}$; (b) $\frac{67\pi}{6}$

4. $\frac{\pi}{12}$

5. 0.3125(J)

6. $\frac{4}{9\pi}\left(\frac{\sqrt{2}}{4}+1\right)$

7. (a) $2-\frac{5}{e}$

   (b) $\frac{x}{8}-\frac{1}{32}\sin 4x+C$

   (c) $-\frac{1}{4}\cos 2x-\frac{1}{8}\cos 4x+C$

   (d) $\frac{\sec^3 x}{3}+C$

   (e) $\frac{5}{2}\left(\arcsin x-\frac{1}{5}x\sqrt{5-x^2}\right)+C$

   (f) $-\frac{1}{x}-\arctan x+C$

   (g) $-\ln\frac{2}{3}$

   (h) 4

8. 14

9. $\frac{\pi}{81}(145\sqrt{145}-1)$

10. 2π

11. ∞

12. (a) divergent

    (b) convergent but not absolutely convergent

(c) absolutely convergent

(d) convergent

13. radius of convergence $R = \frac{1}{2}$; interval of convergence $\left[-\frac{5}{2}, \frac{7}{2}\right)$

14. $e^3 \sum_{n=0}^{\infty} \frac{(x-3)^n}{n!}$

15. $\sum_{n=0}^{\infty} \frac{x^{2n+2}}{2^{2n+1}(2n+1)!}$

16. $(x-1)^2 + (y-2)^2 + (z-3^2) = 30$

17. (a) $\theta = \arccos \frac{10}{\sqrt{290}}$

(b) $\text{proj}_{\vec{a}}\vec{b} =< -\frac{20}{29}, \frac{30}{29}, \frac{40}{29} >$; $\text{comp}_{\vec{a}}\vec{b} = \frac{10}{\sqrt{29}}$

(c) $\vec{a} \times \vec{b} =< 9, 10, -3 >$.

18. 226

19. $\left(4, \frac{11\pi}{6}\right)$.

20.