Math122 Answers to Exam 2 (Midterm) review problems

PART 1: True-False Problems

Ch.8. Page 632 True-False Quiz Problems 1 – 18.

1. F **2.** F **3.** T **4.** T **5.** F **6.** T **7.** F **8.** T **9.** F **10.** T
11. T **12.** T **13.** T **14.** F **15.** F **16.** T **17.** T **18.** T

Ch.9. Page 691 True-False Quiz Problems 1 – 16.

1. T **2.** F **3.** T **4.** T **5.** T **6.** T **7.** T **8.** F **9.** T **10.** T
11. F **12.** F **13.** F **14.** F **15.** F **16.** T

Additional True-False Problems.

1. T **2.** F **3.** F **4.** T **5.** F **6.** T **7.** F **8.** F **9.** T **10.** F
11. T **12.** T **13.** T **14.** F **15.** F **16.** T **17.** F **18.** T **19.** F **20.** T
21. F **22.** T **23.** F **24.** T **25.** T **26.** F

PART II. Multiple-Choice Problems

1. (D) **2.** (E) **3.** (D) **4.** (D) **5.** (E) **6.** (B) **7.** (B) **8.** (C) **9.** (C) **10.** (B)
11. (C) **12.** (D) **13.** (E) **14.** (D) **15.** (A) **16.** (B) **17.** (E) **18.** (C) **19.** (A) **20.** (E)
21. (D) **22.** (A) **23.** (C) **24.** (C) **25.** (E) **26.** (C) **27.** (A) **28.** (C) **29.** (D) **30.** (B)
31. (C) **32.** (C) **33.** (D) **34.** (C) **35.** (D) **36.** (A) **37.** (B) **38.** (A) **39.** (B) **40.** (D)
41. (A)

PART III. Essay Problems

1. (a) CV, 1/2 (b) CV, 0 (c) DV (d) CV, 0 (e) CV, $-\ln 2$ (f) CV, e^4

2. (b) 3 **3.** (a) ACV (b) ACV (c) CV (d) DV (e) ACV (f) ACV

4. 1.185662037, 0.02 **5.** 0.904412037, 0.0046

6. (a) 1, (0, 2] (b) 3, [−5, 1) (c) 3, [−3, 3] (d) ∞, $(-\infty, \infty)$

7. (a) $\displaystyle\sum_{n=0}^{\infty} x^{2n} = 1 + x^2 + x^4 + \cdots$ (b) $\displaystyle\sum_{n=1}^{\infty} nx^{n-1} = 1 + 2x + 3x^2 + \cdots$

(c) $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{n+1} x^{n+1} = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 + \cdots$ (d) $\displaystyle\sum_{n=0}^{\infty} (-1)^n \frac{x^{4n+2}}{(2n+1)!} = x^2 - \frac{x^6}{3!} + \frac{x^{10}}{5!} + \cdots$

(e) $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n x^{n+2}}{n!} = x^2 - \frac{x^3}{1!} + \frac{x^4}{2!} - \frac{x^5}{3!} + \cdots$

8. $\displaystyle\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{n!}$, 0.0996666667 **9.** $T_3(x) = 1 + x + x^2/2$ **10.** 0.000053

11. (a) $\left(\sqrt{3}, 1\right)$ (b) $\left(-2\sqrt{2}, 2\sqrt{2}\right)$ (c) $(0, 0)$ (d) $(0, -5)$ (e) $\left(\dfrac{3}{2}, -\dfrac{3\sqrt{3}}{2}\right)$

12. (a) $(1,0)$) (b) $\left(2\sqrt{3},\frac{\pi}{6}\right)$ (c) $\left(2\sqrt{2},\frac{3\pi}{4}\right)$ (d) $\left(2,\frac{2\pi}{3}\right)$ (e) $\left(2,\frac{3\pi}{2}\right)$

13. (a) $-(2+\sqrt{3})$ (b) $\dfrac{4\pi}{4+\pi^2}$ (c) $\dfrac{\sqrt{3}}{3}$

14. (a) H-tangent line: $\left(\frac{3}{2},\frac{\pi}{3}\right),(0,\pi),\left(\frac{3}{2},\frac{5\pi}{3}\right)$; V-tangent line: $(2,0),\left(\frac{1}{2},\frac{2\pi}{3}\right),\left(\frac{1}{2},\frac{4\pi}{3}\right)$
(b) H-tangent line: $\left(\frac{\sqrt{2}}{2},\frac{\pi}{6}\right),\left(-\frac{\sqrt{2}}{2},\frac{\pi}{6}\right),\left(\frac{\sqrt{2}}{2},\frac{11\pi}{6}\right),\left(-\frac{\sqrt{2}}{2},\frac{11\pi}{6}\right)$;
V-tangent line: $(1,0),(-1,0)$

15. (a) $\dfrac{3\pi}{8}-1$ (b) $\dfrac{9}{2}$ **16.** (a) π (b) $\dfrac{1}{2}$ **17.** $\dfrac{1}{2}$ **18.** (a) $\dfrac{(4+\pi^2)^{\frac{3}{2}}-8}{3}$ (b) π

19. (a) $\sqrt{2}$ (b) $\sqrt{17+4\sqrt{2}}$ (c) $\sqrt{25-12\sqrt{2}}$ (d) $2\sqrt{2}$ (e) $\sqrt{2}$ (f) $\sqrt{2}/2$ (g) $\sqrt{2}$

20. (a) 11 (b) $\langle -15,-15,-5\rangle$ (c) $\langle 13,-15,-14\rangle$ (d) -10
(e) $\cos^{-1}\dfrac{\sqrt{15}}{6}$ (f) $\sqrt{35}$ (g) 10

21. (a) $\sqrt{6}$ (b) $\sqrt{21}$ (c) $\cos^{-1}\dfrac{\sqrt{42}}{7}$ (d) $x=2-t,\ y=-1+2t,\ z=1$ (e) $2\sqrt{\dfrac{6}{5}}$ (f) $4x+2y-3z-3=0$ (g) $\dfrac{10}{\sqrt{29}}$ (h) 20 (i) $\dfrac{10}{\sqrt{101}}$ (j) $\dfrac{x-1}{4}=\dfrac{y-3}{2}=-\dfrac{z+1}{3}$ (k) $\cos^{-1}\dfrac{3}{\sqrt{534}}$

22. $-1,2$ **23.** 13 **24.** $15\sqrt{3}$

25. $\mathbf{r}=\langle 1,2,3\rangle+t\langle 2,-1,3\rangle;\ x=1+2t, y=2-t, z=3+3t;\ \dfrac{x-1}{2}=-\dfrac{y-2}{1}=\dfrac{z-3}{3}$

26. $\mathbf{r}=\langle 1,2,3\rangle+t\langle 2,0,-2\rangle;\ x=1+2t, y=2, z=3-2t;\ \dfrac{x-1}{2}=-\dfrac{z-3}{2},\ y=2$

27. $\mathbf{r}=\langle 1,1,1\rangle+t\langle 1,-1,-1\rangle;\ x=1+t, y=1-t, z=1-t;\ x-1=-(y-1)=-(z-1)$

28. $\mathbf{r}=\langle 0,1,0\rangle+t\langle 0,1,1\rangle;\quad x=0,\ y=1+t,\ z=t;\quad x=0,\ y-1=z$

29. $2x-y+3z-8=0$ **30.** $x+4y-8z+15=0$ **31.** $4x-3y-z+1=0$

32. $x-y-z+1=0$ **33.** $x-11y-4z-23=0,\ 44/\sqrt{138}$ **34.** (a) $\cos^{-1}\dfrac{5}{\sqrt{33}}$, (b) 0

35. (a) $\{(x,y)\mid xy\geq 1,\ x\neq\pm 2\}$, (b) 1/7 **36.** (a) $\{(x,y)\mid x<y^2\leq 4\}$, (b) 0

37. $(\sqrt{3},3,2),\ \left(4,\frac{\pi}{3},\frac{\pi}{3}\right)$ **38.** $\left(2\sqrt{2},\frac{\pi}{4},-1\right),\ \left(3,\frac{\pi}{4},\cos^{-1}\left(-\frac{1}{3}\right)\right)$

39. $(2\sqrt{2},2\sqrt{2},4\sqrt{3}),\ \left(4,\frac{\pi}{4},4\sqrt{3}\right)$

40. (a) $r^2+z^2=4,\ \rho=2$ (b) $r^2\cos^2\theta+z^2=4,\ \rho^2(1-\sin^2\phi\sin^2\theta)=4$