Unverified Key for 1st Semester Review Limits, Continuity, Derivatives, PVA, F, F', F", and Related Rates (I will review these answers when I can and do the few missing too). If you think any are in error, please let Mike know. I did them pretty fast. Thanks

1. 4x +3 2. 0 3. -3/4

4a. -1 4b. 2 4c. 3/2 4d. 2 4e. 1 4f. DNE

5. DNE 6. F(2)= DNE lim f(x) as x approaches 2 is 6

7 . 2/3 8. -2 9. 27 10. 1 11. 0 12. 2

13. hole at x=-3 and asymptote at x=-2

14. Discontinuity at x=1, jump discontinuity

15. b=2 and a=1 16a. c, d 16b. c,d,e,f,g

17. $(x^3-x^2-1)(2x)+(3x^2-2x)(x^2+2)$

18. $(3x^2+30x-12)/(x+5)^2$

19. $(2x^3+5x^2)^3(6x^2+15x)$

20. $(3x^5)/\sqrt{(x^2-9)}+12x^3(x^2-9)$

21. -2sin(x)sin(2x)+cos(x)cos(2x)

22. $6(\tan^2 2x)(\sec^2 2x)$

23. -2cot(2x)/sin(2x)

24. $e^{x^2}(2x)$

25. $-e^{-x}(\cos(e^{-x})$

26. 2/x 27. Cot(x)

28a. b 28b. d

29. y-5= -1(x+1) 30. Y+3= -3(x-1) 31. 2.5

32a. $y-(3/2)(\sqrt{3})= 3(x-\pi/6)$ 32b. 2.527

32c. y=TBD 32d. θ=.6234

33a. x=-2 rel min 33b. inc $(-2,\infty)$; dec $(-\infty, -2)$

34a. 2.2/.75 34b. 4 35a. .33 35b. .4

36. $f'(3) < f(3) < f''(3)$ 37. TBD

38a. to the right, 8 ft/sec 38b. 0

38c. Speeding up (0,6) and (10, 16) 38d. (2/5) ft/sec^2

38e. 3 times

39a. $v(t)=3x^2-18x+23$ 39b. moving to the left (0, 4.155)

39c. to the left and position is 3 39d. a(t)=6x-18

39e. x(4)=-3ft v(4)=-1 ft/sec, moving to the left 1 ft/sec a(t)=6 ft/sec^2

40. average velocity-2 ft/sec b. at t=2 IROC equals AROC

41a. 488 ft 41b. (4, 12) 41c. $v(t)= 3t^2-2$

41d. 190 ft/sec 41e. $\sqrt{6}/3<t<12$ 41f. 95 ft/sec

41g. $t=\sqrt{(97/3)}$ 41h. a(t)= 6t 41i. 48 ft/sec^2

41j. TBD

42a. -1.819 42b. $(0,\pi)$ 42c. –cos(t)cm/s 42d. .832 cm/s

42e. $(\pi/2,3\pi/2)$ 42f. -.136 cm/s^2 42g. 1.638 and 4.780 seconds

42h. 2sin(t) cm/s^2 42i. 1.819cm/s^2 42j. TBD

43. Absolute extrema at x=-2 max and x=2 min

44. Local extema at x=-1/3 and 2 since f' goes from pos to neg or vice versa

45. f"(a)<f(a)<f'(a) conc down, 0, positive slope

46. x=-1/2 point of inflection since f" goes from + to – there

47. x=0 and x=4 are points of inflection since f" changes sign there

48. f increasing on (-∞,0)

49. f concave down where f"<0 all x f is concave down

50. x= -2, 4/3 local extrema

51. same as 50

52a. f(x)= -x+6 (2,4) and f(x)=x+2(4,6)

52b. f has an abs max at x=2

52c. T 52d. F

53a. x=-4,0,4 since f'= 0 or DNE there

53b. (-6,-4) and (0,4) inc (-4,0) and (4,6) dec since f' pos inc and f' neg dec

53c. Points of inflection: x=-2 and 2 since f" pos to neg there

53d. conc up (-6,-4) and (-4,-2) and (2,4) and (4,6) since f" pos there

Conc down (-2,0) and (0,2) since f" neg there

54. $y'=-6x$ 55. $(-y-3x^2y^2)/(2x^3y+x)$

56. $y''=(y'y'-3)/(1+y')$

57a. $(4xy-8)/(6y^2-2x^2-1)$ 57b. xy=2

58a. $(16x-5y)/(5x+3y^2)$ 58b. y+1=3(x-4) 58c. K=-.4

59 a. 9/5 ft/sec 59b. 24/5 ft/sec

60a. $-2/\sqrt{3}$ft/sec 60b. $-80/\sqrt{3}$rad/sec

61. -.0404 ft/sec