MA23100 Even HW answers

HW4 Section 1.5

8. $-\dfrac{\sqrt{2}}{2}$

26. $t = \dfrac{3\pi}{2} + 2\pi n$

60. $p(t) = 6.7\cos(0.158\pi t) + 137$

HW5 Section 2.1

4. discontinuous at $x = -2$.

8. (a) ≈ 0.25.
   (b) ≈ 0.25.
   (c) Yes.
   (d) DNE or $+\infty$.
   (e) Undefined.
   (f) No.

14. (a) F
    (b) F
    (c) F
    (d) F
    (e) T
    (f) F
    (g) F

(h) T

(i) T

(j) F

HW6 Section 2.1

20. 0.6, 0.83, DNE.

22. DNE.

38. 33.

54. Use C5, $\sqrt{19}$.

HW7 Section 2.2

6. -7.

8. -8.

16. $\frac{5\sqrt{3}}{6}$.

20. DNE or $+\infty$.

HW8 Section 2.3

4. a. $-10x - 5h$

   b. -50; -45; -40.5; -40.05

10. a. 2

    b. 2; 2; 2; 2

16. a. 0; No

    b. 0.9 degrees per day; 1.5 degrees per day; 1 degrees per day; 0.5 degrees per day; 0 degrees per day; -0.1 degrees per day; -0.4 degrees per day; -2 degrees per day; -1.4 degrees per day; 0 degrees per day

    c. day 1; day 5; day 6; day 10

    d. Explanation omitted here.

24. m

HW9 Section 2.4

4. a. Omitted here.
   b. Omitted here.
   c. $-14x$
   d. 28; 0; -14; Answer whether or not these slopes are in agreement with slopes drawn in b.

12. a. Omitted here.
    b. Omitted here.
    c. $2x - 1$
    d. -5; -1; 1; Answer whether or not these slopes are in agreement with slopes drawn in b.

20. $y = 12x + 16$; $y = 0$; $y = 48x - 128$

32. $L2$; $L3$; $L4$; $L6$; Explanation omitted here.

HW10 Section 2.5

8. $-x^{-\frac{1}{2}}$

12. $-3\sin x$

22. $-2x^{-2} - \frac{1}{2}$

36. $\frac{3}{2}\cos x + \frac{5}{8}\sin x$

42. $y = \frac{13}{4}x - 3$

HW11 Section 2.6

4. a. $2t - \frac{1}{2}$
   b. 2
   c. $\frac{7}{2}$ meters per second; 2 meters per squared seconds
   d. $\frac{11}{4}$ second

6. a. $3 + \sin t$
   b. $\cos t$
   c. $3 + \frac{\sqrt{3}}{2}$ millimeters per second; $\frac{1}{2}$ millimeters per squared seconds
   d. $\frac{3}{2}\pi + 2n\pi$ second, n = ...-2,-1,0,1,2,...

16. a. $1.41W^{0.41}$

18. a. 4000t
    b. 300,000 people
    c. 40,000 people/year

HW12 Section 2.7

10. $(35x^4 + 9x^2)(9x^8 - 7x\sqrt{x}) + (7x^5 + 3x^3 - 50)(72x^7 - \frac{21}{2}x^{\frac{1}{2}})$

32. $\frac{(2t+7)(2t^2-3t-7)-(4t-3)(t^2+7t-1)}{(2t^2-3t-7)^2}$

92. $-3x + 13$

HW13 Section 2.7

22. $\frac{1}{1+\cos x}$

36. $\frac{-1}{\sin t+1}$

96. a. $\frac{-100t^2+450}{(2t^2+9)^2}$
    b. 12.92 thousands
    c. -0.16 thousands per year or -160 people per year

HW14 Section 2.8

4. $2\tan x \sec^2 x$

14. $-3\sin(3t - 4)$

26. $\frac{\cos\sqrt{t}}{2\sqrt{t}}$

HW15 Section 2.8

32. $\frac{8x(x^2+3)^3(x^3-1)^5-15x^2(x^3-1)^4(x^2+3)^4}{(x^3-1)^{10}}$

54. $-x^{-\frac{3}{2}}$

72. a. $D = 5c + 125$; $c \approx 2.199w$
    b. 5
    c. 2.199
    d. 10.995

HW16 Section 2.9

6. $108(3x + 2)^{-5}$

12. $8\sec^2(2x)\tan(2x)$

38. $12t^2 + 2$

HW17 Section 3.1

8. relative max: $(-1, \frac{13}{2})$; relative min: $(\frac{2}{3}, \frac{113}{27})$; graph omitted here

16. relative max: $(0, 3)$; relative min: $(2, -13)$ and $(-2, -13)$; graph omitted here

98. critical points: $(1, 5)$, $(3, 1)$, $(4, 5)$ and $(5, 2)$; relative max: $(1, 5)$ and $(4, 5)$; relative min: $(3, 1)$ and $(5, 2)$

HW18 Section 3.2

2. relative min: $(-\frac{1}{2}, -\frac{5}{4})$; no inflection points; graph omitted here

4. relative min: $(2, -51)$; relative max: $(-2, 45)$; inflection points: $(0, -3)$; graph omitted here

8. relative min: $(-2, -27)$ and $(1, 0)$; relative max: $(0, 5)$; inflection points: $(-1.22, -13.48)$ and $(0.55, 2.31)$; graph omitted here

HW19 Section 3.2

10. relative min: $(1, 0)$; no inflection points; graph omitted here

18. relative maximum: $(0, 3)$; inflection points: $(-\frac{1}{\sqrt{3}}, \frac{9}{4})$ and $(\frac{1}{\sqrt{3}}, \frac{9}{4})$; graph omitted here

44. $(2, 2)$

108. a. relative min: $(6.459, 797381.7)$
     b. $(3.039, 857232.4)$
     c. graph omitted here

HW20 Section 3.3

2. 0

6. 7

20. Graph omitted here.

36. Graph omitted here.

48. a. 100cc; 50cc; 20cc; 2cc; 0.99cc
     b. 0
     c. 100cc

HW21 Section 3.4

8. abs max value: 4; abs min value: -23

16. abs max value: 12; abs min value: -13

22. abs max value: 2; abs min value: -2

50. No abs max or min.

HW22 Section 3.5

2. $x = 35$ and $y = 35$

18. 4800 square yards

20. $l = 8.5$ ft, $w = 8.5$ ft, and maximum area $A = 72.25\ ft^2$

24. dimensions: $4 \times 4 \times 2$ ft; minimum surface area: 48 ft^2

HW23 Section 3.5

26. $\frac{3\sqrt{3}}{8}$
30. 6.5 dollars
36. 26.2093 months
38. 6×8 yards

HW24 Section 3.6 and 3.7

3.6

6. $\frac{1}{20}x + 5$
14. 10.17

3.7

2. $\frac{2-y}{x+2y}$; $-\frac{4}{3}$
12. $\frac{x+y}{3y-x}$
20. $-\frac{y^3}{x^3}$

HW25 Section 3.7

32. 0; $-\frac{3}{\sqrt{24}}$; $-\frac{9}{4}$
38. 0.0408 $m^2/month$
40. 2.083 ft/sec

HW26 Section 4.1

4. graph omitted here
8. 52.5; 55.125; 63.814
22. $x^4e^x(5+x)$

26. $(\cos x - \sin x)e^x$

62. graph omitted here

HW27 Section 4.1

16. e^{-x}

34. $\frac{e^{\sqrt{x-4}}}{2\sqrt{x-4}}$

74. $y = -6x + 2$

96. (a) $\frac{-64.6078e^{-0.072t}}{(1+29.44e^{-0.072t})^2}$; meaning of $D'(t)$ omitted here (b) -0.0274

HW28 Section 4.2

12. $\log_{10} 1000 = 3$

40. $-\ln 0.01$

HW29 Section 4.2

46. $x^4 + 5x^4 \ln x - x^3$

56. $\frac{x^2-5}{x(x^2+5)}$

64. $\frac{3\ln^2 x}{x}$

74. $\frac{x}{5+x^2}$

98. a. 78%
    b. 54%
    c. 30%
    d. 38.5%
    e. $-\frac{15}{t+1}$
    f. maximum value: 78; no minimum value
    g. $-\infty$; meaning omitted here.

HW30 Section 4.3

8. a. 0.3466
   b. 1414
   c. 2049299
   d. 3.1697

14. a. $P(t) = P_0 e^{0.08t}$
    b. 21,665.74; 23,470.22
    c. 8.7 years

32. a. 400; 520; 1214; 2059; 2396; 2478
    b. $\frac{4200e^{-0.32t}}{(1+5.25e^{-0.32t})^2}$

HW31 Section 4.4

8. 8.06 days

12. 40.8 g

26. a. 0.9%
    b. 76.3%

32. 8 P.M.

HW32 Section 5.1

4. $4x + C$

8. $\frac{1}{3}x^3 - \frac{1}{2}x^2 + 2x + C$

20. $\frac{3}{5}x^{\frac{5}{3}} + C$

HW33 Section 5.1

28. $\frac{1}{8}\sin 2\theta + C$

32. $-\frac{5}{2}\cot 2x + C$

44. $-\frac{3}{8}\cos 8x + \frac{21}{8}$

52. $3t^2 + 30$

62. a. $32.307e^{0.1049t} - 32.307$

b. 516

c. 1111

d. 595

HW34 Section 5.2

2. a. 60

b. 53.125

14. $\frac{7}{12}$

HW35 Section 5.3

4. 9

10. $e^2 - 1$

12. $2 \ln 4$

54. $\frac{63}{4}$

HW36 Section 5.4

2. $\frac{3}{10}$

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

24. 62.5