MA221 Even Answers

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6. $x = -3$
32. $4x + 3y + 1 = 0$

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6. $x^2 + y^2 - 6x - 8y - 15 = 0$
16. $(x-4)^2 + (y+3)^2 = 5$; Center: $(4, -3)$; Radius: $\sqrt{5}$

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6. y-intercept (0,1); symmetric about y-axis; no asymptotes; extent: $\mathbb{R}$
10. intercepts at the origin; symmetric about x-axis; no asymptotes; extent: $[0, \infty]$
24. intercepts at the origin; no symmetries; vertical asymptote x=-2, horizontal asymptote y=1; extent: $(-\infty, -2) \bigcup (-2, \infty)$

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20. Focus: (0,2); Directrix: x=-2

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4. Vertices: $(0, \pm 3)$; Foci: $(0, \pm\sqrt{5})$; Semiminor: b=2
10. Vertices: $(\pm 3, 0)$; Foci: $(\pm 2, 0)$; Semiminor: $b = \sqrt{5}$
22. $\frac{x^2}{4} + \frac{y^2}{3} = 1$
28. $\frac{x^2}{49} + \frac{4y^2}{25} = 1$

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6. $C = 10,000 + 20x$
8. $y = 20 - x$
14. domain: $(-\infty, \infty)$; range: $[2, \infty)$
30. $g(0) = 1$; $g(2) = -3$
32. $F(1) = -2$; $F(-2) = 16$

42. a) $\frac{1}{x^3}$; b) $\frac{1}{x^3}$; c) x
44. $f(0) = 0$; $f(1) = 1$; $f(3) = 9$

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2. 0
4. 2.72
16. 8
18. 1
24. $\frac{3}{4}$
34. 5
36. $\frac{1}{2}$
38. $\frac{2}{3}$
40. 0

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2. -5
4. -2x
8. $-12x^2$
18. $\frac{1}{2\sqrt{x-2}}$

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6. y'=8x-1
14. $y' = x^3 + \frac{2}{3}x$

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2. v=-6t; a=-6; v=0 when t=0
24. 16 ft/sec

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Group A

2. $-16x^{-5} + 8x^{-3}$
4. $\frac{-1}{3x^{\frac{4}{3}}}$
6. $\frac{3}{2}\sqrt{x}$
10. $\frac{-4}{x^3} + \frac{3}{x^4}$
12. $3(2x-3)(x^2-3x+2)^2$
14. $20x^3(4+x^4)^4$
18. $\frac{x}{(1-x^2)^{\frac{3}{2}}}$

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Group A

26. $9x^2(x-1)^2(2x-1)$
34. $\frac{-8s}{(s^2-4)^2}$

Group B

2. $\frac{x}{\sqrt{x^2+2}}$
18. $-\frac{3x+4}{2x3\sqrt{x+1}}$
28. $\frac{2x^3-40x^2-24}{3(x^2+1)^{\frac{2}{3}}(x-8)^2}$

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2. $y'' = \frac{3}{4x^{\frac{5}{2}}}$
4. $f''(x) = 30x^4 - 48x^2 + 8$
8. $\frac{d^2y}{dx^2} = -\frac{1}{(x^2-1)^{\frac{3}{2}}}$

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36. $f'''(x) = \frac{3}{8}(x+3)^{\frac{-5}{2}}$

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2. $-1/2$
10. $-\sqrt{2}$
12. 0
22. $\frac{-\sqrt{2}}{2}$

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54. 0
56. $\sin\theta$
64. $\sin^2 3x$
88. $\frac{1}{2}\sin 8x$

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2. $6\cos 3x$
6. $-2x\sin x^2$
22. $2x(2x\cos 4x + \sin 4x)$
34. $\sin 2x$
38. $2x\cos^2 x\cos x^2 - 2\sin x^2 \sin x\cos x$
48. $-0.17A$

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2. $12\sec^2 4x$
18. $3\sec^3 x \tan x$
20. $\frac{-\csc^2 x}{3\cot^{\frac{2}{3}} x}$
24. $\frac{3}{4}\sqrt[4]{\sec 3\theta}\tan 3\theta$

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4. Decreasing on $(-\infty, -1]$ and $[0, 1]$. Increasing on $[-1, 0]$ and $[1, \infty)$.
6. $(2, -1)$ is minimum point.
12. $(-1, 9)$ is maximum point, $(1, 5)$ is minimum point.
18. $(0, 0)$ is a minimum point.

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4. Concave Up: $(-\infty, 1]$. Concave Down: $[1, \infty)$.
6. CU: $[-2, 0]$. CD: $(-\infty, -2]$ and $[0, \infty)$.
8. CU: $(-\infty, -2)$. CD: $(-2, \infty)$.
10. CU everywhere, no inflection points, min at $(1, 0)$.
18. $(-2, 22)$ is max, $(1, -5)$ is min. CD on $(-\infty, -1/2]$ and CU on $[-1/2, \infty)$. Inflection point: $(-1/2, 17/2)$.
20. Max: $(1, 6)$. Min: $(-3, -26)$. CU: $(-\infty, -1]$. CD: $[-1, \infty)$. IP: $(-1, -10)$.
24. No extreme values. CD: $(-\infty, 0)$. CU: $(0, \infty)$. No inflection points.

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30. $(1, f(1)) = (1, 2)$ minimum. $(-1, -2)$ maximum. No inflection point ($y'' \neq 0$). Concave down for $x < 0$, concave up for $x > 0$.

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2. .302 A
14. 150m $\times$ 100m
16. $x = 60$ft, $y = 20$ft.

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22. Base of square is $2\sqrt[3]{4} \times 2\sqrt[3]{4}$. Height is $32^{1/3} = 2\sqrt[3]{4}$. Cube!
24. $\frac{50\pi}{4+\pi}$ cm is used for the circle.
28. 2ft $\times$ 2ft $\times$ 3ft
34. 45 new wells

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2. $\frac{dy}{dt} = 6$
12. 314 cm^3/s
16. 1.6 cm^2/min
20. $\frac{2\sqrt{7}}{3}$ m/s

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2. $(2x + \frac{1}{x^2})dx$
6. $\Delta y = \frac{1}{3.2^2} - \frac{1}{3^2} = -.0135$
   $dy = -\frac{2}{x^3}dx = -\frac{2}{3^3}(.2) = -.0148$
8. Approximate Error: .40 in^2. Percentage Error: $\frac{.4}{5^2} \times 100 = 1.6\%$.
16. $dR = .6\Omega$.

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2. $F(x) = x^2 + C$
6. $F(x) = \frac{2}{5}x^5 - 2x^3 + \frac{1}{2}x^2 + 5x + C$
8. $F(x) = \frac{1}{2}x^2 - \frac{7}{5}x^5 + C$
12. $F(x) = -\frac{2}{\sqrt{x}} + C$

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2. 15/2
4. 26/3
6. 1/6
8. 1

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2. $\frac{2}{5}x^{\frac{5}{2}} - \frac{1}{2}x^2 + C$
4. $3x^{\frac{1}{3}} + 2x^{\frac{3}{2}} + C$
12. $-\frac{1}{9}(4 - x^3)^3 + C$
14. $\frac{1}{16}(x^4 + 1)^4 + C$
20. $\frac{-1}{3}(1 - 2t)^{\frac{3}{2}} + C$
22. $\frac{3}{8}(t^2 + 1)^{\frac{4}{3}} + C$
24. $2\sqrt{x^2 - x} + C$
28. $x - \frac{2}{3}x^3 + \frac{1}{5}x^5 + C$
30. $2\sqrt{x} + x + C$

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54. 2
56. 28/3
60. 10/3
62. 2
64. 1/3
66. 136/3
68. $16\sqrt{2}/3$

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10. 1/3
20. 1/2
22. 1/6
30. 7/6

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2. $y = x^3 + 1$
4. $y = \frac{3}{4}x^4 - x - 11$
6. $y = \frac{1}{4}x^4 - 4x + 7$
10. 20m
20. 3.6 seconds. 36 m/s.

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4. $\frac{1}{2}(\sqrt{5} - 1)$
6. $f_{rms} = \frac{\sqrt{21}}{7}$
12. $i_{rms} = \sqrt{206/15} \approx 3.7$ A

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6. $V = \int_0^a \pi x dx = \frac{1}{2}\pi a^2$
12. 8π
20. 24π

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8. π
12. π
14. $\pi/2$

16. $32\pi/3$

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6. $(2/3, 1/3)$
10. $(8/3, 8/3)$
16. $(8/15, 16/105)$
26. $(5/2, 5)$

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2. a: 18 ft-lb b: 31.5 ft-lb
4. 48 ft-lb
8. 300J + 150J = 450J

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10. 48 wJ
12. 18π wJ
18. 32000 J

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30. 36 wN
32. 10 wN
34. 120 wN

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38. 1/3 wN
42. 21 wN