

C2 Numerical Answers

January 2005

- $243 + 810x + 1080x^2$
- (a) (9, 5) (b) $(x - 9)^2 + (y - 5)^2 = 52$
- (a) $x = 1.46$ (b) $x = 0.5$
- (b) $x = 270$
- (a) $a = -10, b = 21$
- (a) 0.9 (b) 8 (c) 79.588 (d) 0.412
- (a) 5.6 cm (b) 15.7 cm (c) 5.95 cm^2
- (a) $x = -5$ or $2; y = 5$ or 26 (b) $57\frac{1}{6}$
- (b) $\frac{80}{4+\pi}$ (d) 448 m^2

June 2005

- $x = 3, y = -18$
- (a) 1.29 (b) $\frac{1}{6}$
- (b) $(x + 4)(2x - 1)(x - 3)$
- (a) $1 + 12px + \frac{12 \times 11}{2}(px)^2$ (b) $p = -2, q = 24$
- (a) $x = 50, 110$ (b) $x = 77.1, 102.9$
- (a) 1.600, 3.200, 3.394 (b) 43.86 (c) 5260 m^3
- (a) 0.548 (b) 0.58, 2.56
- (a) (5, 0) (b) 4 (c) (1, 0), (9, 0) (d) $y = -\frac{2}{7}(x - 5)$
- (b) 39 400 (c) 1 042 000
- (a) 6.75

January 2006

- (a) $c = 2$ (b) $(2x - 1)(x + 2)$ (c) 3.5
- (a) $1 + 9px + \frac{9}{2}(px)^2$ (b) $p = 4; q = 576$
- (a) $\sqrt{26}$ (b) $\left(\frac{7}{2}, \frac{5}{2}\right)$ (c) $(x - 3.5)^2 + (y - 2.5)^2 = 6.5$
- (b) 9.49 (c) 415.9277... (d) 4
- (b) 1.287 (c) 16.087 (d) 4.1
- (a) $t = 15, v = 3.80; t = 25, v = 9.72; t = 30, v = 15.37$ (b) 154
- (a) $6x^2 - 10x - 4$ (b) (2, -10) and $\left(-\frac{1}{3}, 2\frac{19}{27}\right)$
(c) $12x - 10$ (d) (2, -10) is a min; $\left(-\frac{1}{3}, 2\frac{19}{27}\right)$ is a max
- (a) $\theta = 6.9, 113.1$ (b) 243.4 or 296.6
- (a) $\frac{1}{2}, \frac{3}{2}$ (b) $\frac{1}{3}$
- (a) 6.75

June 2006

- (a) $c = 2$ (b) $(2x - 1)(x + 2)$ (c) 3.5
- (a) $1 + 9px + \frac{9}{2}(px)^2$ (b) $p = 4; q = 576$
- (a) $\sqrt{26}$ (b) $\left(\frac{7}{2}, \frac{5}{2}\right)$ (c) $(x - 3.5)^2 + (y - 2.5)^2 = 6.5$
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- (b) 1.287 (c) 16.087 (d) 4.1
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(b) 154
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- (a) $\theta = 6.9, 113.1$ (b) 243.4 or 296.6
- (a) $\frac{1}{2}, \frac{3}{2}$ (b) $\frac{1}{3}$
- (a) 6.75

January 2007

- (a) $f'(x) = 6x + 6$ (b) $15\frac{3}{4}$
- (a) $1 - 10x + 40x^2 - 80x^3 + \dots$
- $(x - 1)^2 + (y - 5)^2 = 5$
- $x = 1.76$
- (b) $(x + 2)(x + 3)(x - 1)$ (c) $-3, -2, 1$
- $x = \frac{\pi}{6}, \frac{5\pi}{6}$
- $\frac{7}{2}$
- (a) $v = 70$ (b) $\frac{d^2C}{dv^2} = 2800v^{-3}$ (c) £40
- (a) $\frac{2\pi}{3}$ (c) $9\sqrt{3} \text{ m}^2$ (d) 22.1 m^2 (e) 24.6 m
- (b) 204 600 (c) 1.25 (d) $-1 < r < 1$ or $|r| < 1$

June 2007

- $-2 + 4\sqrt{2}$
- (a) -16 (b) $(x + 2)(3x - 2)(x - 3)$
- (a) $1 + 6kx + \frac{6 \times 5}{2}(kx)^2 + \frac{6 \times 5 \times 4}{3 \times 2}(kx)^3$
(b) $\frac{2}{5}$ (c) $\frac{32}{25}$
- (b) $\frac{1}{4}\sqrt{7}$
- (a) 1.414, 3.137 (b) 4.04 (c) 1.96
- (a) -0.107 (b) $x = 21$
- (a) $3y = -2x + 9$ (c) $(x - 6)^2 + (y + 1)^2 = 26$
- (a) $50000r^{n-1}$ (c) 2023 (d) £760000
- (b) $\left(0, \frac{1}{2}\right), \left(\frac{5\pi}{6}, 0\right), \left(\frac{11\pi}{6}, 0\right)$ (c) 0.18, 1.91
- (b) 943 cm^3

January 2008

- (a) (i) 5, (ii) 0 (b) $x = 2, -2$
- (a) $r = 2$ (b) $a = 1\frac{1}{4}$ (c) 1310719
- (a) $1 + 5x + 11.25x^2 + 15x^3$ (b) 1.05114
- (b) $230.8^\circ, 309.2^\circ$
- $a = 3\sqrt{3}, b = \sqrt{3}$
- (a) 253 m (b) $\theta = 45.8^\circ$
- (c) $10\frac{2}{3}$
- (a) $(x - 6)^2 + (y - 4)^2 = 3^2$ (c) 3.507
- (b) $\frac{300}{x} + 2x^2$ (d) 106.7

June 2008

- (b) $(2x - 1)(x - 5)$
- (a) 1.732, 2.058, 5.196 (b) 5.899
- (a) $1 + 10ax + 45(ax)^2 + 120(ax)^3 + \dots$ (b) $a = 0.75$
- (a) 1.21 (b) $x = 1$
- (a) $(x - 3)^2 + (y - 1)^2 = 29$ (b) $5x + 2y - 46 = 0$
- (a) 0.072 (b) 25 (d) 28
- (a) 5.6 (b) 19.6 cm^2 (c) 14.3 cm (d) 10.8 cm^2
- (b) $12\frac{2}{3}$
- (a) $65^\circ, 155^\circ$ (b) $40^\circ, 80^\circ, 160^\circ, 200^\circ, 280^\circ, 320^\circ$

January 2009

- $243 - 810x + 1080x^2$
- $\frac{125}{6}$ or $20\frac{5}{6}$
- (a) 3.84, 4.14, 4.58 (b) 7.852
- $x = \frac{4}{5}$
- (b) $m_1 m_2 = -1$
- (a) $a = -20$ (b) $b = -6$
- (a) 39.6 (b) 2.04 (c) 61
- (b) 284.5, 435.5, 644.5
- (c) $\frac{3}{4}$ or 0.75 (d) 64
- (a) 1737

June 2009

- (a) 29
- (a) $128 + 448kx + 672k^2x^2$ (b) $k = 4$
- (a) -8 (b) 1 (c) $(3x - 5)(x + 2)$
- (a) $x = 2$ gives 2.236; $x = 2.5$ gives 2.580 (b) 6.133
- (b) 729 (c) 2182 (d) 2187
- (a) Centre is (3, -2); $r = 5$ (c) (0, 2)
- (i) $\theta = 23.6, 156.4$ (ii) $x = 41.4, 318.6$
- (a) $y = \frac{1}{8}$ or 0.125 (b) $x = \frac{1}{8}$
- (b) $\sqrt[3]{900}$, or 9.7 (d) 279.65

January 2010

- $729 - 1458x + 1215x^2$
- $x = 30, 150$
- (a) $a = 5, b = -1$ (b) $(x + 2)(2x + 3)(x - 1)$
- (b) 20.9 cm^2
- (a) $x = 8$ (b) $x = \frac{3}{2}$
- (b) $n = 13$ (c) £314.70 (d) 7455.94
- (a) (1, 0), (4, 0) (c) $\frac{1}{3}x - \frac{5}{2}x^2 + 4x$ (+c) (d) $6\frac{1}{6}$
- (a) (2, -1) (b) 6.5 (c) A (-4, -3.5), B (8, -3.5) (e) 15.6
- (a) (4, 6) (b) $-3x^{\frac{3}{2}} - \frac{3}{4}x^{\frac{1}{2}}$ (c) maximum

June 2010

- (a) 2.35, 3.13, 4.01 (b) 2.828
- (a) -98 (b) $\frac{2}{3}, -4, 5$
- (a) $2x - \frac{1}{2}kx^{\frac{1}{2}}$ (b) $a = \pm 5$
- (a) $1 + 7ax + 21a^2x^2 + 35a^3x^3$ (b) 6.133
- (a) $\tan \theta = 0.4$ (b) $x = 10.9^\circ, 100.9^\circ, 190.9^\circ, 280.9^\circ$
- (a) 6.3 (b) 28.35 (c) 7.58 (d) 5.76
- (b) $x = 8$
- (b) $14\frac{2}{3}$
- (b) $r = 1.03$ (d) $N = 17$ (e) 287 000
- (a) $(x - 2)^2 + (y - 1)^2 = 100$ (b) $y - 7 = -\frac{4}{3}(x - 10)$
(c) $10\sqrt{3}$

January 2011

- (b) $a = 9, b = -6$
- (a) 1.64 (b) 27.9 cm^2
- (a) $-\frac{1}{5}$ (b) -3750 (c) -3125
- (a) 1 and 5 (b) 36
- (a) 36 (b) 7.2
- (a) 0.30, 0.24 (b) 0.3175 (c) 0.2175
- (b) 228.6, 270, 311.4
- (b) $x = 0, x = 0.56$
- (b) $(x - 3)^2 + (y - 6)^2 = 50$ (d) $y = -7x + 77$
- (a) $100 - 80x + 12x^2$ (b) $74\frac{2}{27}$

June 2011

- (a) -6 (c) $(x + 1)(2x - 1)(x - 4)$
- (a) $243 + 405bx + 270b^2x^2 + \dots$ (b) $b = 3$
- (a) 1.43 (b) $2\frac{1}{3}$
- (a) $(-2, 1)$ (b) $r = 4$ (c) $(0, 1 \pm 2\sqrt{3})$
- (a) 18.8 cm^2 (b) $r = 2$ (c) $2\pi \text{ cm}^2$
- (a) $r = 0.75$ (b) 256 (c) 1024 (d) $n = 14$
- (a) $93.2^\circ, 356.8^\circ$ (b) $\frac{\pi}{3}, \frac{5\pi}{3}$
- (b) 54 cm
- (a) $(-4, 0), (5, 9)$ (b) $R = 121.5$

January 2012

- (a) 28.5 (b) 2680 (c) 2880
- $(x + 1)^2 + (y - 7)^2 = 50$
- (a) $1 + 2x + \frac{7}{4}x^2 + \frac{7}{8}x^3$ (b) 1.2184
- (b) $x = \frac{1}{3}$ or $x = 9$
- (b) $a = 2, b = -2$
- (a) 4, 2.31 (b) 11.88 (c) $11\frac{1}{4}$
- (a) 5.7 cm (b) 17.1 cm^2 (d) 11.7 cm (e) 4.5 cm^2
- (c) 8 m (d) 21 cm
- (i) $x = 55, 135, 175$ (b) $a = 2, b = \frac{\pi}{5}$

June 2012

- $32 - 240x + 720x^2$
- $x = 3, x = 6$
- (a) (10, 8) (c) $y = 4, y = 12$ (d) 19.3
- (b) $(x + 2)(2x - 3)(x - 4)$
- (a) $A(2, 8), B(9, 1)$ (b) $57\frac{1}{6}$
- $x = 39.2, 140.8$
- (a) 1.494, 1.741 (b) 1.4965
- (a) $h = \frac{60}{\pi x^2}$ (c) $x = \sqrt[3]{\frac{120}{4\pi}} \approx 2.12$ (d) 85
- (b) $r = 0.6$ (c) $a = 15$ (d) $S_\infty = 37.5$

January 2013

1. $64 - 960x + 6000x^2$
2. (b) $a = 2, b = 5$
3. (a) $120\,000 \times (1.05)^3 = \text{£}138\,915$ (b) 2024 (c) $\text{£}1\,704\,814$
4. $x = 41.2^\circ, 85.5^\circ$ and 161.2°
5. (a) (i) $M(10, 12)$ (ii) $r = 7$
(b) $MN = 25$ units (c) $NP = 24$ units
6. (b) $x = 25$ or $x = 9$
7. (b) 32.5 cm^2 (c) 42.1 cm^2 (d) 27.2 cm
8. (b) $x = -\sqrt{2}$ (c) $-48x^{-5}$
(d) Maximum at P , Minimum at Q
9. (a) 6.272, 3.634 (b) $R = 11.42 \text{ units}^2$ (c) $R = 12 \text{ units}^2$

June 2013 (R)

1. $x = 2, y = 9$
2. (a) 0.8572 (b) 0.416
3. $256 - 512x + 448x^2 - 224x^3$
4. (a) $a = 6, b = -4$ (b) $f(x) = (3x + 2)(x - 2)(2x - 1)$
5. (c) $r = \frac{3}{2}$ (d) $S_{10} = 2267$
6. (a) $2 + a$ (b) $5a - 4$ (c) $x = 2.498$
7. (a) $x = -4, x = 2$ (b) $R = 36$
8. (b) 670 g
9. (i) $\theta = 123.4^\circ, 176.6^\circ$ (ii) $x = 70.5^\circ, 289.5^\circ$

June 2013

1. (a) $\frac{2}{3}$ (b) 8 (c) 53.877
2. (a) $16 + 96x + 216x^2 + 216x^3 + 81x^4$
(b) $16 - 96x + 216x^2 - 216x^3 + 81x^4$
3. (b) $f(x) = (x - 3)(2x - 3)(x + 2)$ (c) $y = 0.37$
4. (a) $y = 1.538$ (b) 6.24 (c) 18.24
5. (a) 262.5 m^2 (b) 80.2 m
6. (a) -4 and 2 (b) $49\frac{1}{3}$
7. (i) $x = \frac{4}{11}$ (ii) $y = \frac{1}{8}a^5$
8. (i) -83.7 (ii) (b) $\theta = 72, 144, 216, 288$
9. (a) $x = 4, y = -28$ (b) y is a minimum
10. (a) $(x + 5)^2 + (y - 9)^2 = 25$ (b) $PT = 20$