Answers

Straight Line

1. $2y-3x-17=0$ **2.** $\sqrt{3}y+x+4\sqrt{3}=0$ **3.** $p=-5$ **4.** $5y-2x-13=0$

5. (a) $y+3x-2=0$ (b) $2y+x+6=0$ (c) (2, -4)

Quadratic Theory

1. $3(x-2)^2-11$ **2.** $p=7$ **3.** $4k^2+1, so\ b^2-4ac\geq 1\ \therefore roots\ real\ for\ all\ k$

4. $0<k<6$ **5.** $(x-1)(x^2-x+2), b^2-4ac<0\ so\ x^2-x+2\ is\ irreducible$

Differentiation

1. $\frac{49}{8}$ **2.** $y+4x-11=0$ **3.** Max T.P (-4, 49), Min T.P $(\frac{2}{3},-\frac{49}{27})$ **4.** $h'(5)=222$

5. $r=2.34$ **6.** (a) Proof (b) $2\sqrt{55}$

Polynomials

1. $(x+1)(x-5)(x+2)$ **2.** (b) $(-1,9),(3,-7),(4,4)$ **3.** $x=-5, x=-\frac{1}{2}, x=1$

4. $m=1, n=-1\ (x+2)(x-1)(x+1)$

Trigonometry

1. (a) $\frac{3}{\sqrt{13}}$ (b) $\frac{5}{13}$ **2.** (a) $sina=\frac{1}{\sqrt{26}}, sinb=\frac{\sqrt{10}}{6}$ (b) $\frac{\sqrt{26}-5\sqrt{10}}{6\sqrt{26}}$

3. (a) $sinA=\frac{1}{\sqrt{10}}, sin2A=\frac{3}{5}$ (b) $cos3A=\frac{9}{5\sqrt{10}}$ **4.** $x=30°, 90°, 150°, 270°$ **5.** $0, 1.32, 4.97, 2\pi$

Functions

1. (a) $h(x)=4x^2+4x+6$ (b) $4(x+\frac{1}{2})^2+5$ (c) $Parabola\ Min\ T.P\ \left(-\frac{1}{2},5\right), y-intercept\ (0,6)$

2. (a) $h(x)=\frac{1}{\sqrt{x^2-x-6}}$ (b) $x<-2, x>3$ **3.** $f^{-1}(x)=5x+3$

4. (a) Min T.P (0, -3), Max T.P (3,4) (b) Max T.P (0, 7), Min T.P (6, 0)
(c) Parabola with Max T.P & roots at $x=0, x=6$

The Wave Function

1. (a) $\sqrt{13}\sin(x+56\cdot 3)°$ (b) Max value is $\sqrt{13}$ at $x=33\cdot 7°$

2. (a) $3\cos(\theta+311\cdot 8)°$ (b) Min value is -3 at $\theta=228\cdot 2°$

3. (a) $2\sqrt{2}\sin(x-69\cdot 3)°$ (b) $x=114\cdot 3°, 204\cdot 3°$ **4.** $x=0\cdot 13, 2\cdot 22$

Integration

1. $3x^2+\frac{1}{x}+c$ **2.** 86 **3.** (a) A (-4, -28), B(4, 28) (b) 128 squared units **4.** $y=2x^3-5x+1$

Further Calculus

1. $-\frac{1}{(2x-3)^2}+c$ **2.** 9 **3.** $-\frac{9}{8}$ **4.** (a) $proof$ (b) $x-\frac{1}{2}cos2x+c$ **5.** $4\cos(2x-\frac{\pi}{3})$

Recurrence Relations

1. (a) $U_0 = 20, U_2 = 29, U_3 = 32 \cdot 2$ (b) As $-1 < \frac{4}{5} < 1$, a limit exists. $L = 45$

2. (a) $m = \frac{2}{3}, c = 15$ (b) $L = 45$

3. (a) $U_{n+1} = 0 \cdot 53U_n + 5 \cdot 5, U_0 = 60, U_1 = 37 \cdot 3, U_2 = 25 \cdot 27, U_3 = 18 \cdot 89$ (b) Yes, $L = 11 \cdot 7$tons

Vectors

1. $a = -2, b = -1$ **2.** B(3, 1, -2) **3.** $12 + 3\sqrt{3}$ **4.** 67°

Circles

1. $(x-4)^2 + (y-7)^2 = 1$ **2.** $y + x - 9 = 0$ **3.** A(-1, -6) and B(5, 0)

Logarithms

1. -2 **2.** $x = 1 \cdot 965$ **3.** $x = 4$ **4.** (a) $k = 0 \cdot 09$ (b) $t = 7 \cdot 7 \approx 8\ sec$

5. $k = 6 \cdot 3, n = 2 \cdot 1$ **6.** $a = 2, b = 64$