COORDINATE GEOMETRY(I)

Form 6

Vol 4

Part 5B – Delta/α/β

1.	B	2.	B	3.	D	4.	A	5.	D
6.	D	7.	C	8.	D	9.	A	10.	C
11.	D	12.	C						

1. B

Sum of roots = 0

$$-\frac{3+k}{3}=0$$

$$k=-3$$

2. B

Let the roots be α and 4α

$$\alpha(4\alpha)=1$$

$$\alpha^2=\frac{1}{4}$$

$$\alpha=\frac{1}{2} \text{ or } \alpha=-\frac{1}{2}$$

$$\alpha+4\alpha=-\frac{k+1}{2}$$

$$k=-10\alpha-1$$

$$k=-6 \text{ or } k=4$$

3. D

Let the roots be α and $\alpha+4$

$$\alpha+\alpha+4=-\frac{-20}{4}$$

$$2\alpha=1$$

$$\alpha=\frac{1}{2}$$

$$\alpha(\alpha+4)=\frac{m}{4}$$

$$m=4\left(\frac{1}{2}\right)\left(\frac{1}{2}+4\right)=9$$

4. A

Let the roots be $\alpha-2$ and $\alpha+2$

$\alpha-2+\alpha+2=-\dfrac{-4}{k}$

$\alpha=\dfrac{2}{k}$

$(\alpha-2)(\alpha+2)=\dfrac{-4k-1}{k}$

$\alpha^2-4=\dfrac{-4k-1}{k}$

$\dfrac{4}{k^2}-4=\dfrac{-4k-1}{k}$

$4-4k^2=k(-4k-1)$

$4-4k^2=-4k^2-k$

$k=-4$

5. D

Let the roots be α and β

$\alpha+\beta=-15$

$\alpha\beta=-2$

$\alpha-\beta$

$=\sqrt{(\alpha-\beta)^2}$

$=\sqrt{(\alpha+\beta)^2-4\alpha\beta}$

$=\sqrt{(-15)^2-4(-2)}$

$=\sqrt{233}$

6. D

Let the roots be α and β

$\alpha+\beta=-15$

$\alpha\beta=-2$

$\alpha^4-\beta^4$

$=(\alpha+\beta)^2(\alpha-\beta)^2$

$=[(\alpha+\beta)^2-2\alpha\beta](\alpha+\beta)(\alpha-\beta)$

$=[(-15)-2(-2)](-15)(\sqrt{233})$

$=-52433$

7. C

Let the roots be α and β

$\alpha+\beta=-15$

$\alpha\beta=-2$

$(2\alpha-1)(2\beta-1)$

$=4\alpha\beta-2\alpha-2\beta+1$

$=4(-2)-2(-15)+1$

$=23$

8. D

$\alpha+\beta=\frac{4}{3}$

$6\beta^2-8\beta-9=0$

$6\beta^2=8\beta+9$

$6\beta^2+8a$

$=8\alpha+8\beta+9$

$=8(\frac{4}{3})+9$

$=\frac{59}{3}$

9. A

$(\log_a x)^2-\log_a x+7=0$

$\log_a \alpha+\log_a \beta=10$

$\log_a \alpha\beta=10$

$\alpha\beta=a^{10}$

10. C

$-3\times4^{2x}+32\times4^x-48=0$

$(4^\alpha)(4^\beta)=\frac{-48}{-3}$

$4^{\alpha+\beta}=16$

$2^{\alpha+\beta}=4$

11. D

Let the roots be α and $-\beta$

$-\alpha\beta = \frac{-3}{4}$

$\alpha - \beta = \frac{-k}{4}$

$(\alpha+\beta)^2 = \frac{k^2}{16}$

$\alpha^2 + 2\alpha\beta + \beta^2 = \frac{k^2}{16} - 4\alpha\beta$

$(\alpha+\beta)^2 = \frac{k^2}{16} - 4\alpha\beta$

$\alpha(\alpha+4) = \frac{m}{4}$

$\alpha + \beta$

$= \frac{\pm k^2 + 48}{26}$

$\frac{1}{\alpha} + \frac{1}{\beta}$

$= \frac{\pm\frac{\sqrt{k^2-48}}{16}}{\frac{3}{4}}$

$= \frac{\pm\sqrt{k^2-48}}{3}$

12. C

Let the roots be $\frac{\alpha^3}{\beta}$ and $\frac{\beta^3}{\alpha}$

$(\frac{\alpha^3}{\beta})(\frac{\beta^3}{\alpha}) = \frac{1}{9}$

$\alpha^2\beta^2 = \frac{1}{9}$

$\alpha\beta = \frac{1}{3}$ or $\frac{-1}{3}$(rejected)

$\frac{\alpha^3}{\beta} + \frac{\beta^3}{\alpha} = \frac{12}{9}$

$\frac{\alpha^4 + \beta^4}{\alpha\beta} = \frac{4}{3}$

$\frac{(\alpha^2 + \beta^2)^2 - 2\alpha^2\beta^2}{\alpha\beta} = \frac{4}{3}$

$(\alpha^2 + \beta^2)^2 = \frac{2}{3}$

$\alpha^2 + \beta^2 = \frac{\sqrt{6}}{3}$ or $\frac{-\sqrt{6}}{3}$(rejected)

Part 6 – Function

1.	A	2.	D	3.	C	4.	D	5.	C
6.	C	7.	B	8.	C	9.	A	10.	C
11.	A	12.	D	13.	C	14.	C		

1. A

2. D

$x-10\geq 0$

$x\geq 10$

3. C

$2x-3>0$

$x>\frac{3}{2}$

4. D

$x\geq 0$ and $\sqrt{x}\neq 4$

$x\geq 0$ and $x\neq 16$

5. C

$2-3x>0$

$x<\frac{2}{3}$

6. C

$x>0$ and $x-1\neq 0$

$x>0$ and $x\neq 1$

7. B

$g(x)$

$=(2(x-4)+3)^2+x-4$

$=(2x-5)^2+x-4$

$=4x^2-20x+25+x-4$

$=4x^2-19x+21$

8. C

$g(-10)-g(10)$

$=4(-10)^2-19(-10)+21-[4(10)^2-19(10)+21]$

$=611-231$

$=380$

9. A

$f(x+1)\cdot f(x+2)$

$=\frac{x+1}{x+2}\cdot\frac{x+2}{x+3}$

$=\frac{x+1}{x+3}$

10. C

$h(2t) = 8$

$(2t)^2 + 2t - 4 = 8$

$4t^2 + 2t - 12 = 0$

$t = \frac{3}{2}$ or -2

11. A

$f(x+1) = f(x-1)$

$(x+3)^2 + k = (x+1)^2 + k$

$(x+3)^2 = (x+1)^2$

$x+3 = (x+1)$(rejected) or $-(x+1)$

$x+3 = -x-1$

$x = -2$

12. D

$f(2) = 2k$

$(2+2)^2 + k = 2k$

$k = 16$

13. C

$g(2x-3)$

$= 2(2x-2)^2 - 7(2x-2) - 2$

$= 8x^2 - 30x + 20$

14. C

$f(2m-1) - f(2m+1)$

$= \frac{1}{4}[2(2m-1)+3] - n(2m-1) - \frac{1}{4}[2(2m+1)+3] + n(2m+1)$

$= \frac{1}{4}(4m+1)^2 - \frac{1}{4}(4m+5)^2 + 2n$

$= \frac{1}{4}(4m+1-4m-5)(4m+1+4m+5) + 2n$

$= \frac{1}{4}(-4)(8m+6) + 2n$

$= -8m - 6 + 2n$