COORDINATE GEOMETRY(I)

Form 6
Vol 4

Part 1 – Basic coordinates

1.	C	2.	D	3.	C	4.	B

1. C

Let $B(h,k)$

$\because AB//DC$ and $BC//AD$

$$\begin{cases}\frac{k-4}{h+1}=\frac{-1+2}{2+3}\\ \frac{k+1}{h-2}=\frac{4+2}{-1+3}\end{cases}$$

$\therefore B(4,5)$

2. D

Let $C(h,k)$

$\frac{4h+7(-1)}{4+7}=5$ and $\frac{4k+7(3)}{4+7}=13$

$\therefore h=\frac{31}{2}$ and $k=\frac{61}{2}$

3. C

Let $P(h,k)$

$$\begin{cases}k=2h+1\\ (h-2)^2+(k+1)^2=(h-6)^2+(k-3)^2\end{cases}$$

$-4h+4+2(2h+1)+1=-12h+36-6(2h+1)+9$

$-4h+4h+12h+12h=36+9-4-1-2-6$

$24h=32$

$h=\frac{4}{3}$

$k=\frac{11}{3}$

4. B

Let $A(h,2)$

$(11-h):(13+8)=2:7$

$h=5$

Part 2 – Equation of straight line

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

1. C

$$\frac{-3}{7-a}=\frac{a}{6}$$
$$a(a-7)=18$$
$$a^2-7a-18=0$$
$$a=9 \text{ or } a=-2$$

2. A

$$\frac{3-k}{8}\times\frac{4}{k}=-1$$
$$3-k=-2k$$
$$k=-3$$

3. A

I is true.

$$\frac{5}{p}>1$$
$$\therefore 0<p<5$$

II is true.

$$-1<\frac{5}{q}<0$$
$$5<-q \ (\because q<0)$$
$$q<-5$$

III is false.

$$\because p<5 \text{ and } q<-5$$
$$\therefore p+q<0$$

4. C

$$A\left(-\frac{k}{2},0\right) \text{ and } B\left(-\frac{3k}{2},0\right)$$
$$\frac{-\frac{k}{2}-\frac{3k}{2}}{2}=10$$
$$k=-10$$
$$\begin{cases}12x-15y-60=0\\8x+10y-120=0\end{cases}$$
$$\therefore y=4$$

5. C

$$-\frac{3}{k}\times-\frac{4}{6}=-1$$
$$12=-6k$$
$$k=-2$$

x-intercept $=-\frac{4k}{3}=\frac{8}{3}$

6. D

I is true.

x-intercept of $L_2>0$

$\therefore c>0$

II is true.

x-intercept of $L_1<0$

$\therefore \frac{b}{a}<0\Rightarrow ab<0$

III is true.

Slope of $L_1>0$

$\therefore a>0$

x-intercept of $L_2>$ x-intercept of L_1

$\therefore c>\frac{b}{a}\Rightarrow ac>b$

7. A

$P\left(\frac{a}{6},0\right),Q\left(0,\frac{a}{2}\right)$

$\because$ P is the midpoint of QS.

$\therefore S\left(\frac{a}{3},-\frac{a}{2}\right)$

$\frac{a}{3}=4$

$a=12$

$P(2,0),Q(0,6),S(4,-6)$

Note that RS is horizontal.

Area of ΔPQR

$=$ Area of $\Delta QRS-$ area of ΔPRS

$=\frac{1}{2}(4+18)(6+6)-\frac{1}{2}(4+18)(0+6)$

$=66$

8. C

y-int of $L_1 = 9$

x-int of $L_1 = -15$

Let k be the y-int of L_2

$$\frac{k-0}{0+15} \times \frac{3}{5} = -1$$

$k = -25$

$$\text{Area} = \frac{1}{2}(9+25)(0+15) = 255$$

9. C

I is true.

Slope of $L_1 <$ Slope of L_2

$$\therefore \frac{2}{a} < \frac{1}{c}$$

$a > 2c$ ($a < 0$ and $c < 0$)

II is false.

y-int of $L_1 >$ y-int of L_2

$$-\frac{b}{a} > -\frac{d}{c}$$

$\therefore ad > bc$

III is true.

x-int of $L_1 >$ x-int of L_2

$$\frac{b}{2} > d$$

$\therefore b > 2d$

10. A

$A\left(-\frac{120}{a},0\right), B(0,30)$

$P\left(\frac{3\left(-\frac{120}{a}\right)}{2+3}, \frac{2(30)}{2+3}\right)$

$\therefore P\left(-\frac{72}{a},12\right)$

$\frac{12-4}{-\frac{72}{a}+18}\times\frac{a}{4}=-1$

$2a=\frac{72}{a}-18$

$a^2+9a-36=0$

$a=3$ or $a=-12$(rej.)

$\therefore P(-24,12)$

Let k be the y-int of L_2

$\frac{k-4}{0+18}=\frac{12-4}{-24+18}$

$k=-20$

11. A

I is true.

y-int of L_1 > y-int of L_2

$\therefore b>d$

II is true.

Slope of L_1 > Slope of L_2

$-a>-c$

$\therefore a<c$

III is false.

x-int of $L_1=-1$

$-a=b$

$a+b=0$

x-int of $L_2>-1$

$\frac{d}{c}>-1$

$d<-c$ ($\because c<0$)

$c+d<0$

$\therefore a+b=0>c+d$

12. D

I is true.

By considering the x-int of the two straight lines,

$\frac{1}{a} > 0$ and $\frac{1}{c} < 0$

$a > 0$ and $c < 0$

$\therefore ac < 0$

II is true.

By considering the y-int of the two straight lines,

$\frac{1}{b} = \frac{1}{d}$

$\therefore b = d$

III is true.

By considering the slopes of the two straight lines,

$-\frac{a}{b} > -\frac{c}{d}$

$-ad > -bc$

$\therefore ad - bc < 0$