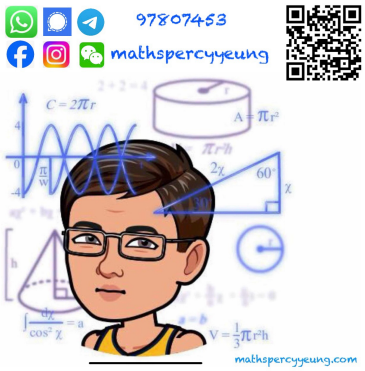
Equation of Straight Lines
Multiple Choice Question



[19-20]

1. [19-20 Mid-year, #7]

Find the equation of the straight line with slope $-\frac{1}{2}$ and x-intercept 5.

A. $x+2y-10=0$ **B.** $x+2y+10=0$
C. $x+2y-5=0$ **D.** $x+2y+5=0$

2. [19-20 Mid-year, #20]

The area enclosed by the straight lines $4x+7y+84=0$, the y-axis and $y=-4$ is

A. 56 square units.
B. 112 square units.
C. 126 square units.
D. 252 square units.

[20-21]

3. [20-21 S4 Standardized Test #3]

Find the constant k such that the straight lines $x+2y+k=0$ and $kx-3y+5=0$ are perpendicular to each other.

A. 12
B. 6
C. –6
D. –12

4. [20-21 S4 Standardized Test #4]

It is given that $\begin{cases} L_1: 2x+y+3=0 \\ L_2: x-2y-1=0 \end{cases}$. Denote the point of intersection of L_1 and L_2 by A. Find the equation of the straight line which passes through the origin and A.

A. $x-y=0$
B. $x+y=0$
C. $x-2y=0$
D. $2x+y=0$

5. [20-21 S4 Standardized Test #5]

The straight line L is parallel to the straight line $4x-2y+1=0$. If the x-intercept of L is 5, then the equation of L is

A. $2x-y+5=0$.

B. $2x-y-10=0$.

C. $x-2y+10=0$.

D. $x+2y-5=0$.

6. [20-21 S4 Standardized Test #8]

In the figure, the equation of the straight line L is $ax-by+10=0$. Which of the following must be correct?

I. $a>-5$

II. $b>2$

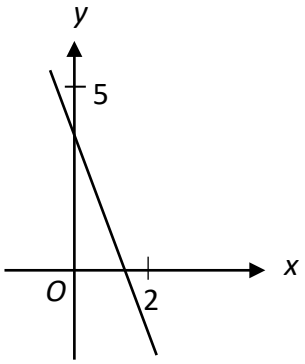
III. $a<b$

A. I only

B. II only

C. I and III only

D. II and III only



7. [20-21 S5 Mid-year #5]

The equation of the straight line L is $3x + 4y + 2 = 0$. The equation of the straight line passing through $(3, -5)$ and perpendicular to L is

A. $4x + 3y - 3 = 0$.
B. $4x - 3y - 27 = 0$.
C. $3x + 4y - 3 = 0$.
D. $3x - 4y - 27 = 0$.

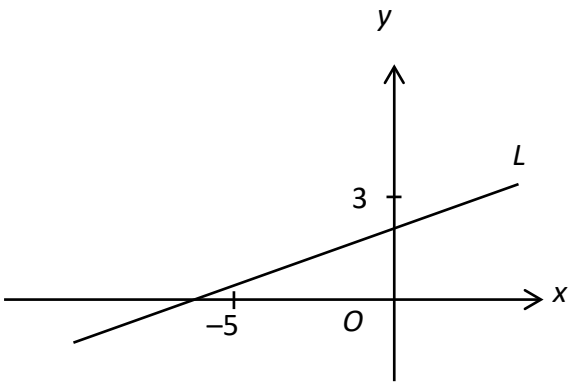
8. [20-21 Final Exam, #13]

The coordinates of points A, B and C are $(3, 3)$, $(1, -2)$ and $(-3, 4)$ respectively. Let P be the mid-point of BC. Find the equation of AP.

A. $x - 2y + 3 = 0$
B. $3x + 2y + 1 = 0$
C. $7x + 10y - 19 = 0$
D. $11x + 2y - 7 = 0$

9. [20-21 Final Exam, #25]

In the figure, the equation of the straight line L is $x + ay = b$. Which of the following is/are true?



I. $a < 0$
II. $b < 3a$
III. $b < -5$

A. I only
B. II only
C. I and III only
D. II and III only

10. [20-21 Final Exam, #26]

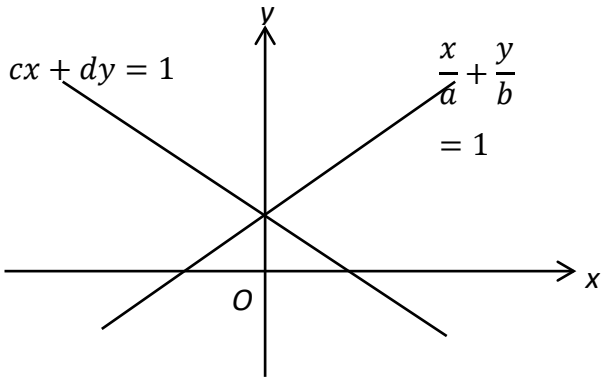
In the figure, the two straight lines intersect at a point on the positive y-axis. Which of the following are true?

I. $a < 0$

II. $c < 0$

III. $bd = 1$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III



11. [20-21 S.5 Final Exam, #18]

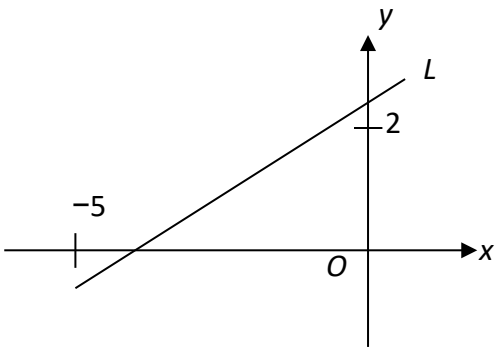
In the figure, the equation of the straight line L is $x + by + c = 0$. Which of the following are true?

I. $0 < c < 5$

II. $-2.5 < b < 0$

III. $c > -2b$

I and II only
I and III only
II and III only
I, II and III



[21-22]

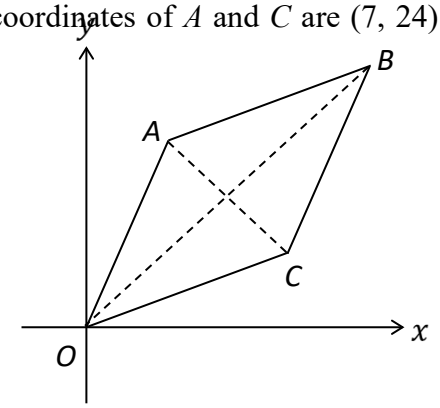
12. [21-22 Final Exam, #8]

The slope of the straight line L: $(m + 10)x - my - 20 = 0$ is -4. Find the y-intercept of L.

A. –10
B. –2.5
C. 2.5
D. 10

13. [21-22 Final Exam, #9]

In the figure, O is the origin and $OABC$ is a rhombus. The coordinates of A and C are (7, 24) and (20, 15) respectively. Find the equation of OB.



A. $2x - y = 0$
B. $9x - 13y = 0$
C. $13x - 9y = 0$
D. $9x + 13y = 0$

14. [21-22 Final Exam, #19]

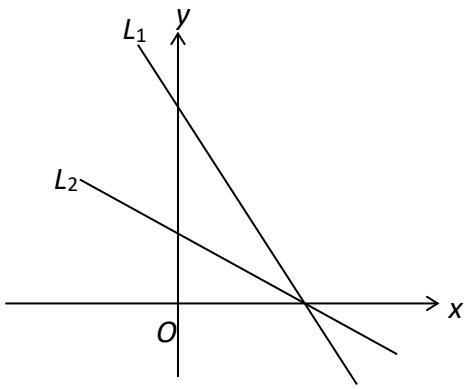
The straight line $7x - 24y + 168 = 0$ cuts the x-axis and the y-axis at A and B respectively. If O is the origin and P is a point on AB such that $OP \perp AB$, then OP =

A. 6.72 .
B. 7.16 .
C. 7.28 .
D. 8.24 .

15. [21-22 Final Exam, #24]

In the figure, the equations of straight lines L_1 and L_2 are $y = \frac{2x+b}{a}$ and $y = \frac{cx-d}{2}$ respectively. L_1 and L_2 intersect at a point on the positive x-axis. Which of the following are true?

I. $c < 0$
II. $bc - 2d = 0$
III. $ac < 4$



A. I and II only
B. I and III only
C. II and III only
D. I, II and III

16. [21-22 S.5 Mid-year, #8]

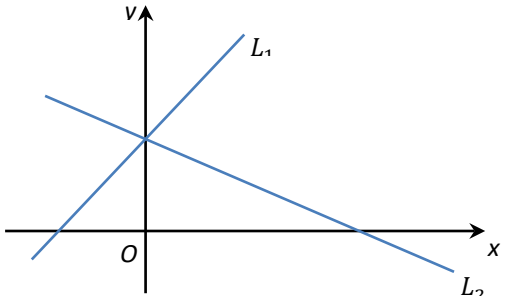
Find the constant k such that the straight lines $kx+4y+8=0$ and $4x-8y-k=0$ are perpendicular to each other.

A. –8
B. –2
C. 2
D. 8

17. [21-22 S.5 Mid-year, #17]

In the figure, the equations of the straight lines L_1 and L_2 are $ax+2by=1$ and $3cx+4y=d$ respectively. L_1 and L_2 intersect at a point on the positive y-axis. Which of the following are true?

I. $bd=2$
II. $a<\frac{3}{2}bc$
III. $ad>3c$

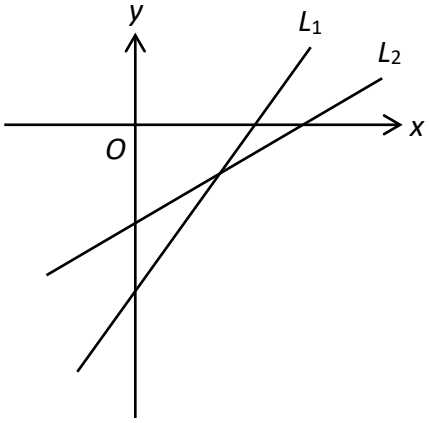


A. I and II only
B. I and III only
C. II and III only
D. I, II and III

18. [21-22 S.5 Mid-year, #22]

In the figure, the equations of the straight lines L_1 and L_2 are $2x+ay=b$ and $cx-5y=3b$ respectively. Which of the following are true?

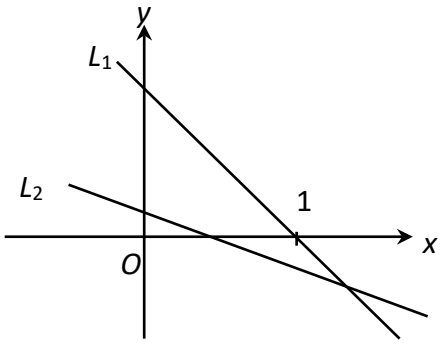
I. $b>0$
II. $c>a$
III. $ac>-10$



A. I and II only
B. I and III only
C. II and III only
D. I, II and III

19. [21-22 S.6 Standardized Test, #7]

The figure shows the straight lines L_1: $y + ax = b$ and L_2: $y + cx = d$. Which of the following are true?



I. $a > c > 0$

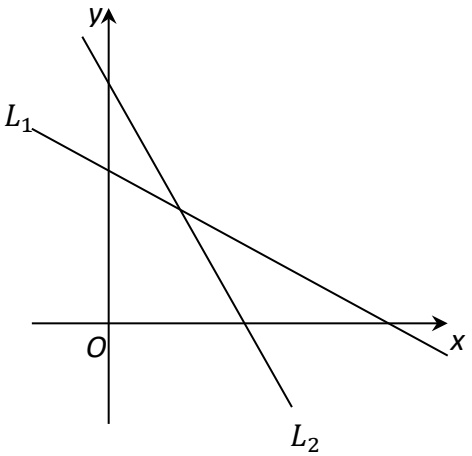
II. $b > d$

III. $c > d$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

20. [21-22 S.6 Mock, #7]

In the figure, the equations of the straight line L_1 and L_2 are $x - ay - b = 0$ and $x - cy - d = 0$ respectively. Which of the following are true?



I. $a > c$

II. $b > d$

III. $bc > ad$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

21. [21-22 S.6 Mock, #25]

Let k be a constant. The equations of straight lines L_1 and L_2 are $kx - 2y + 15 = 0$ and $kx + 8y - 3 = 0$ respectively. If $L_1 \perp L_2$, find the difference between the x-intercepts of L_1 and L_2.

A. 1.5
B. 4.5
C. 6.5
D. 10.5

22. [21-22 S.6 Mock, #41]

The equations of the three sides of a triangle are $ax - 6y + 6a = 0$, $ax + 6y - 6a = 0$ and $y = 0$, where a is a positive constant. If the y-coordinate of the in-centre of the triangle is 3, then a =

A. 6
B. 8
C. 10
D. 12

[22-23]

23. [S.4 22-23 Mid-Year,#11]

The equation of the straight line L is $ax - 18y - 5a = 0$, where a is a constant. If L is perpendicular to the straight line $9x + 4y = 0$, find the y-intercept of L.

A. -5
B. $-\frac{20}{9}$
C. $\frac{20}{9}$
D. 5

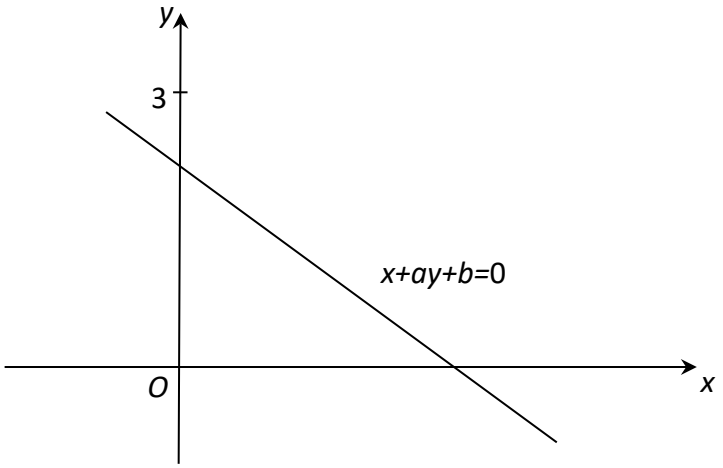
24. [S.4 22-23 Mid-Year,#20]

The figure shows the graph of the straight line $x+ay+b=0$. Which of the following are true?

I. $a>0$

II. $b<0$

III. $3a+b>0$



A. I and II only

B. I and III only

C. II and III only

D. I , II and III

25. [S.4 22-23 Mid-Year,#21]

Consider two straight lines L_1: $2x-7y-7=0$ and L_2: $7x+2y+2=0$. Which of the following must be true?

I. L_1 and L_2 have no intersections.

II. $L_1 \perp L_2$

III. L_1 and L_2 have the same x-intercept.

A. I only

B. II only

C. I and III only

D. II and III only

26. [S.4 22-23 Mid-Year,#22]

The equation of the straight line L is $y=\frac{1}{4}x+3$. L intersects the x-axis and straight line $x=8$ at A and B respectively. The straight line $x=8$ intersects the x-axis at C. Find the area of ΔABC.

A. 18 sq. units

B. 36 sq. units

C. 50 sq. units

D. 100 sq. units

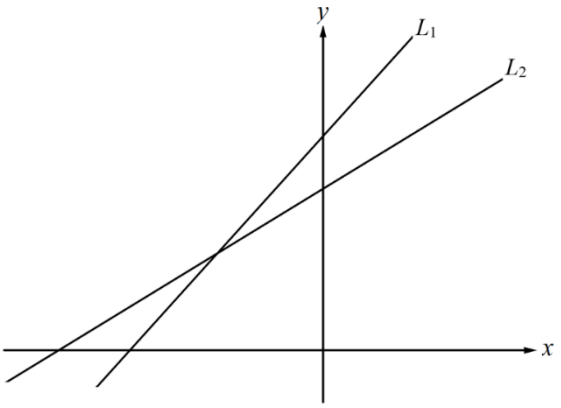
27. [S.4 22-23 Final,#5]

If the straight lines $hx-3y+2=0$ and $4x+6y-5=0$ are parallel, then $h=$

A. -4.
B. -2.
C. 2.
D. 4.

28. [S.4 22-23 Final,#22]

In the figure, the equations of the straight lines L_1 and L_2 are $ax+by+1=0$ and $cx+dy+1=0$ respectively. Which of the following must be true?

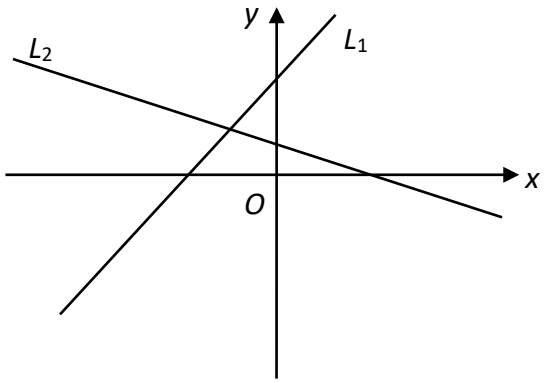


I. $a>c$
II. $b>d$
III. $ad<bc$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

29. [S.5 22-23 Mid-year,#9]

In the figure, the equations of the straight lines L_1 and L_2 are $x+ay=-1$ and $y=-bx+c$ respectively. Which of the following are true?

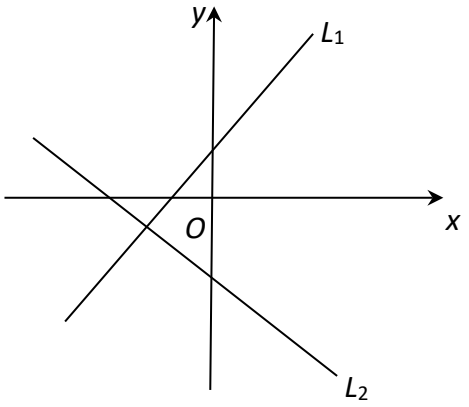


I. $a<0$
II. $b>0$
III. $a(b+c)>2$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

30. [S.5 22-23 Final,#19]

In the figure, the equations of the straight lines L_1 and L_2 are $ax + y - b = 0$ and $x + cy - d = 0$ respectively. Which of the following are true?

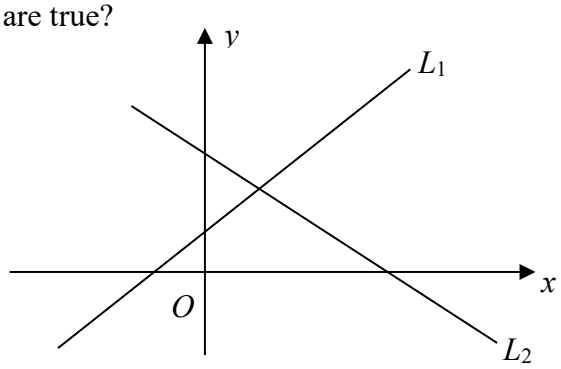


I. $c > 0$
II. $ad > b$
III. $d > bc$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

31. [S.6 22-23 Standardized Test,#4]

In the figure, the equations of the straight lines L_1 and L_2 are $ax - y + b = 0$ and $cx - y + d = 0$ respectively. Which of the following are true?

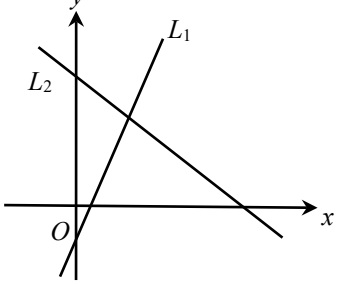


I. $c < 0$
II. $bd > 0$
III. $ad > bc$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

32. [S.6 22-23 Timed Practice 2,#11]

In the figure, the equations of the straight lines L_1 and L_2 are $3x + ay - b = 0$ and $cx + y + d = 0$ respectively, where a, b, c and d are constants. Which of the following must be true?



I. $a < 0$
II. $d > 0$
III. $bc + 3d < 0$

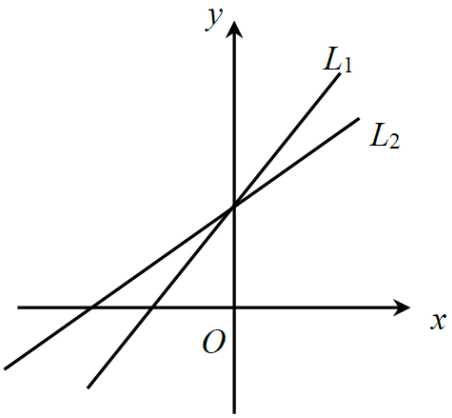
A. I and II only
B. I and III only
C. II and III only
D. I, II and III

33. [S.6 22-23 Timed Practice 4,#24]

In the figure, the equation of L_1 is $x + ay + b = 0$ and the equation of L_2 is $x + cy + d = 0$.

L_1 and L_2 intersect at a point on the positive y-axis. Which of the following are true?

I. $a < 0$
II. $b > d$
III. $ad = bc$



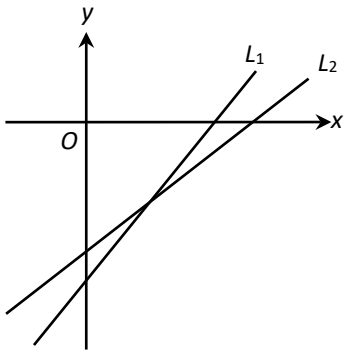
A. I and II only
B. I and III only
C. II and III only
D. I, II and III

34. [S.6 22-23 Timed Practice 5,#26]

In the figure, the equations of the straight lines L_1 and L_2 are $ax + 2y + b = 0$ and $cx + y + d = 0$ respectively. Which of the following is/are true?

I. $a > 2c$
II. $b > 2d$
III. $ad > bc$

A. I only
B. II only
C. I and III only
D. II and III only

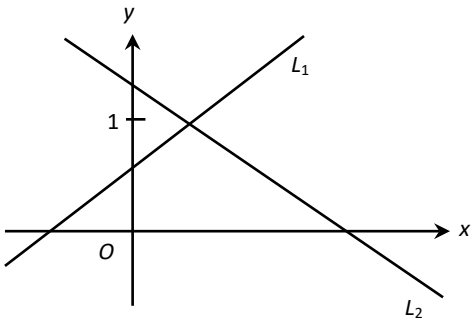


35. [S.6 22-23 Timed Practice 6,#10]

In the figure, the equations of the straight lines L_1 and L_2 are $x + ay + b = 0$ and $x + my + n = 0$ respectively. Which of the following are true?

I. $m + n < 0$
II. $a + b < 0$
III. $m < a$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III



36. [S.6 22-23 Timed Practice 6,#25]

The equations of the straight lines L_1 and L_2 are $3x + hy - 20 = 0$ and $kx + 8y + 15 = 0$ respectively,

where h and k are constants. If L_1 is parallel to L_2 and the y-intercept of L_1 is –5, then k =

A. –6.
B. –4.
C. 4.
D. 6.

37. [S.6 22-23 Timed Practice 6,#40]

The equation of the straight line L is $4x+3y-3k=0$, where k is a positive constant. L cuts the x-axis and the y-axis at the points P and Q respectively. Let R be a point lying on the x-axis such that the y-coordinate of the orthocentre of $\triangle PQR$ is 9. Find the x-coordinate of R.

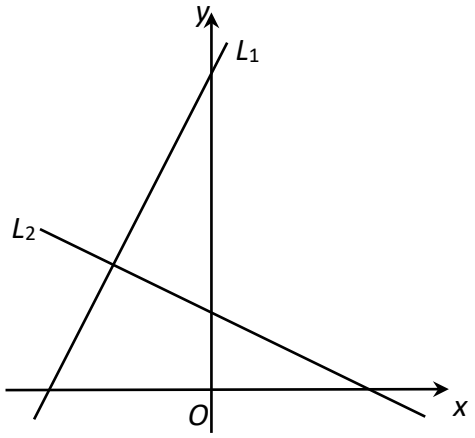
A. –12
B. –3
C. 3
D. 12

38. [22-23 S6 Mock,#7]

In the figure, the equations of the straight lines L_1 and L_2 are $ax - y + b = 0$ and $x + ay + c = 0$ respectively. Which of the following are true?

I. $a > 0$
II. $ac < b$
III. $ab + c > 0$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III



39. [22-23 S6 Mock,#25]

The straight line L is perpendicular to the straight line $2x - 3y + 4 = 0$. If the x-intercept of L is 5, then the equation of L is

A. $3x + 2y - 15 = 0$.
B. $3x + 2y - 10 = 0$.
C. $2x - 3y - 15 = 0$.
D. $2x - 3y - 10 = 0$.

[23-24]

40. [S.4 23-24 Mid-Year,#7]

The equation of the straight line L_1 is $2x+3y+6=0$. If L_2 is a straight line that is parallel to L_1 and passes through $(2,8)$, then the equation of L_2 is

A. $2x+3y-28=0$.
B. $2x+3y+28=0$.
C. $3x+2y-22=0$.
D. $3x+2y+22=0$.

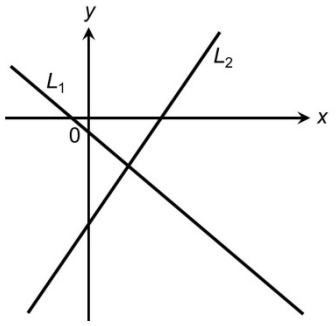
41. [S.4 23-24 Mid-Year,#8]

If the straight lines $hx+9y-2=0$ and $4x+ky+5=0$ do not intersect, which of the following can be the values of *h* and *k*?

A. $h=-3, k=12$
B. $h=3, k=15$
C. $h=12, k=3$
D. $h=16, k=3$

42. [S.4 23-24 Mid-Year,#19]

The figure shows two straight lines $L_1: ax+by=1$ and $L_2: cx+dy=1$. Which of the following must be true?



I. $a<0$
II. $b>d$
III. $bc<ad$

A. I and III only
B. I and II only
C. II and III only
D. I, II and III

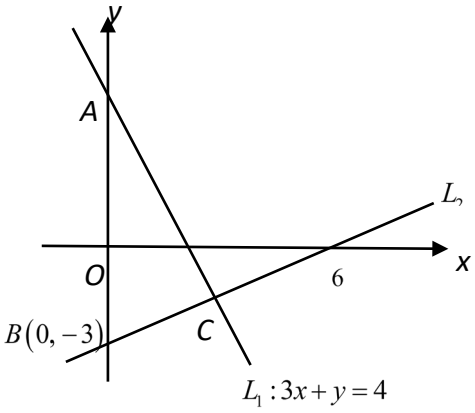
43. [S.4 23-24 Final,#5]

If the straight lines $3x-2y+5=0$ and $kx+21y-9=0$ are perpendicular to each other, then $k=$

A. 6.
B. 12.
C. 14.
D. 21.

44. [S.4 23-24 Final,#15]

In the figure, $L_1:3x+y=4$ cuts the y-axis at A. L_2 is another straight line passing through $B(0,-3)$ and cuts the x-axis at $(6,0)$. Denote the point of intersection of L_1 and L_2 by C. Find the area of ΔABC.

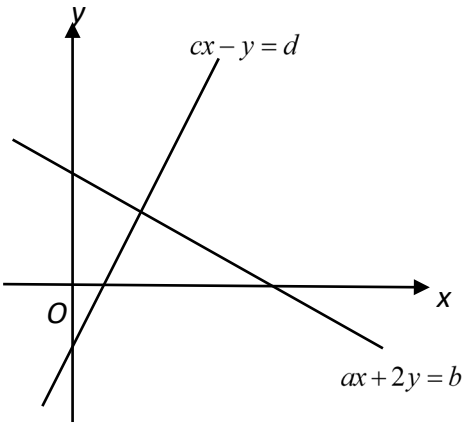


A. 6
B. 7
C. 12
D. 14

45. [S.4 23-24 Final,#16]

The figure shows the straight lines $ax+2y=b$ and $cx-y=d$. Which of the following must be true?

I. $c>0$
II. $b+2d>0$
III. $ad-bc>0$



A. I and II only
B. I and III only
C. II and III only
D. I, II and III

46. [S.5 23-24 Mid-year,#21]

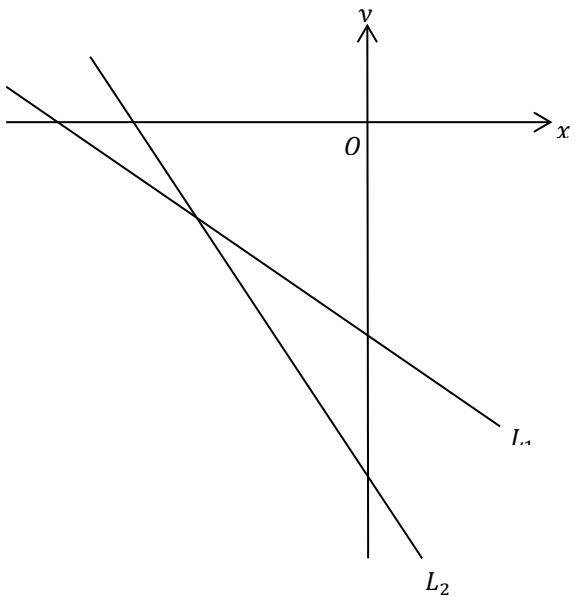
If the straight lines $x+ay=3$ and $x-2y=b$ are perpendicular to each other and intersect at a point on the y-axis, then $b=$

A. -12.
B. -2.
C. $\frac{1}{2}$.
D. 6.

47. [S.5 23-24 Mid-year,#22]

In the figure, the equations of the straight lines L_1 and L_2 are $px+qy=4$ and $mx+ny=8$ respectively. Which of the following are true?

I. $pn<mq$
II. $n<2q$
III. $m<2p$



A. I and II only
B. I and III only
C. II and III only
D. I, II and III

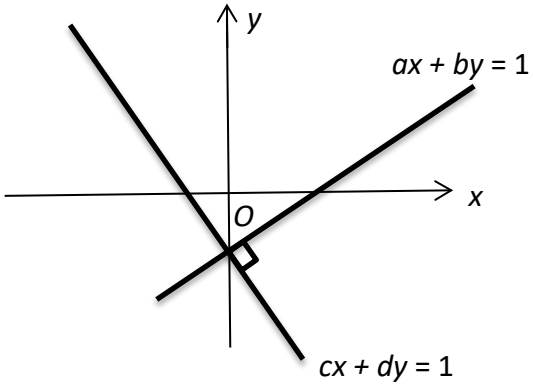
48. [S.5 23-24 Final,#25]

Let a be a constant. Find the possible values of a such that the straight lines $3x+\left(\frac{a}{2}\right)y-7=0$ and $4x-(a+2)y+3=0$ are perpendicular to each other.

A. 6
B. $\frac{6}{5}$
C. -4 or 6
D. -6 or 4

49. [S.5 23-24 Final,#26]

In the figure, the two perpendicular straight lines intersect at a point on the negative y-axis. Which of the following are true?



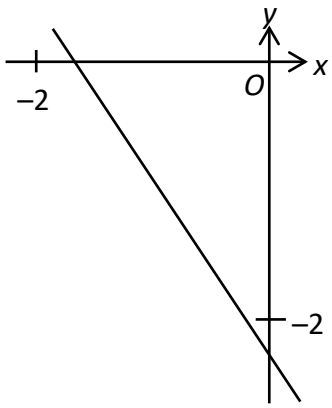
I. $b < 0$.
II. $a < c$.
III. $d^2 + ac = 0$.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

50. [S.6 23-24 Standardized Test,#12]

The figure shows the graph of the straight line $ax + by + 24 = 0$. Which of the following are true?

I. $b < 12$
II. $a > 12$
III. $a = b$



A. I and II only
B. I and III only
C. II and III only
D. I, II and III

51. [S.6 23-24 Timed Practice 2,#22]

$$\frac{1}{5+6x}+\frac{2}{5-6x}=$$

A. $\frac{15+6x}{25-36x^2}$

B. $\frac{15-6x}{25-36x^2}$

C. $\frac{15-18x}{25-36x^2}$

D. $\frac{15}{25-36x^2}$

52. [S.6 23-24 Timed Practice 2,#35]

The equations of the straight lines L_1 and L_2 are $5x-2y+k=0$ and $2x+5y-k=0$ respectively, where k is a positive constant. It is given that L_1 cuts the y-axis at the point A. Denote the point of intersection of L_1 and L_2 by B. If C is a point lying on L_2 such that the in-centre of $\triangle ABC$ lies on the y-axis, then the y-coordinate of C is

A. $\frac{k}{7}$.

B. $2k$.

C. $5k$.

D. $7k$.

53. [S.6 23-24 Timed Practice 4,#22]

A straight line L_1 has the same y-intercept as the straight line $L_2: 3x-5y-15=0$ and L_1 is perpendicular to L_2. Find the equation of L_1.

A. $3x+5y+15=0$

B. $3x-5y-15=0$

C. $5x+3y+9=0$

D. $5x+3y-9=0$

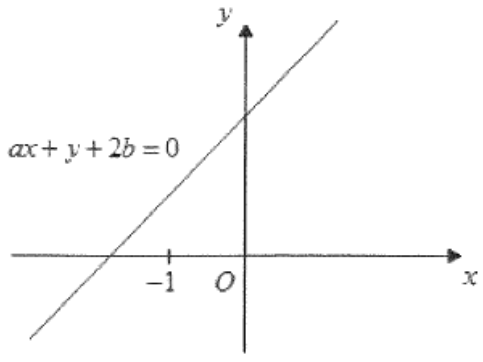
54. [S.6 23-24 Timed Practice 6,#24]

The figure shows the graph of the straight line $ax+y+2b=0$. Which of the following are true?

I. $a<0$

II. $b<0$

III. $\frac{a}{2}<b$



A. I and II only

B. I and III only

C. II and III only

D. I, II and III

~End~

Equation of Straight Lines
Conventional Questions

[19-20]

1. [S.4 19-20 Mid-year, #13]

In **Figure 1**, two straight lines L_1 and L_2 cut the x-axis at B and the origin respectively. A is the point of intersection of L_1 and L_2. C is a point on AB such that OC is the median of AB in ΔAOB. It is given that the equation of L_1 is $x + y - 6 = 0$ and the coordinates of A are (–3, 9).

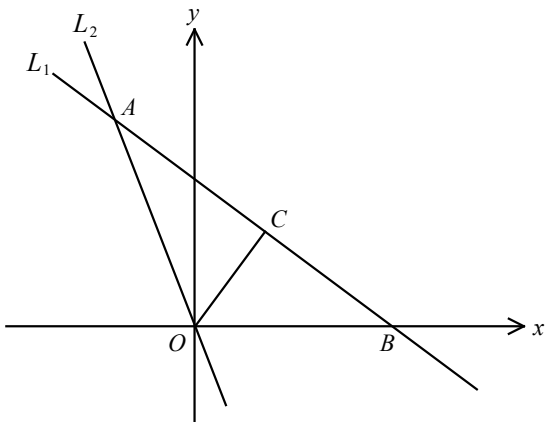


Figure 1

(a) Write down the coordinates of B. **(1 mark)**

(b) Find the equation of OC. **(3 marks)**

2. [S.4 20-21 Standardized Test, #3]

It is given that the straight line L_1 passes through $A(3, -7)$ and $B(1, 5)$.

(a) Find the equation of L_1. **(2 marks)**

(b) The straight line L_2 passes through $C(4, -9)$ and it is perpendicular to L_1. Find the equation of L_2. **(2 marks)**

3. [S.4 20-21 Standardized Test, #4]

The straight line L: $2x - y - 8 = 0$ cuts the x-axis and the y-axis at A and B respectively.

(a) Write down the coordinates of A and B. **(2 marks)**

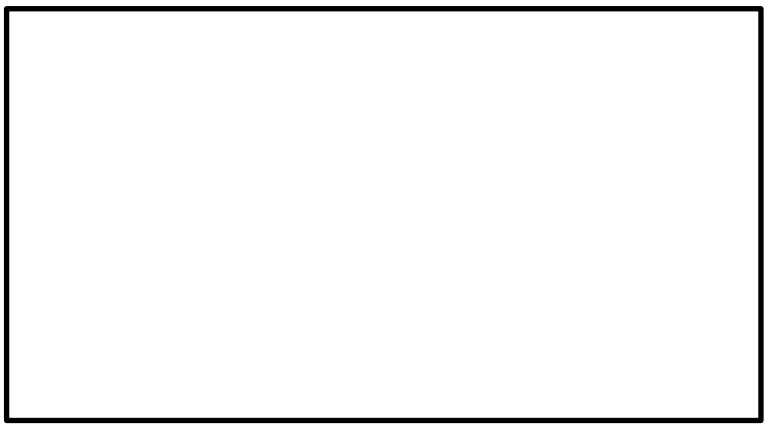
(b) It is given that the perpendicular bisector of AB intersects L at M and cuts the x-axis at C.

(i) Sketch the graph of L and the perpendicular bisector of AB in the box provided.

(ii) Find the equation of the perpendicular bisector of AB.

(iii) Write down the equation of the straight line parallel to the y-axis and passes through C.

(5 marks)



4. [S.4 20-21 Final Exam, #6]

The coordinates of the points A and B are $(-2, 0)$ and $(6, 12)$ respectively. The straight line L_1 passes through A and B.

(a) Find the equation of L_1.

(b) The slope of another straight line L_2 is $-\frac{12}{5}$. If L_2 passes through B, find the equation of L_2.

(4 marks)

5. [S.4 20-21 Final Exam, #16]

In **Figure 1**, the coordinates of A and C are $(-8, 12)$ and $(0, -4)$ respectively. L_1 is the perpendicular bisector of AC and it cuts AC and the y-axis at M and B respectively.

(a) Find the coordinates of M. **(1 mark)**

(b) Find the equation of L_1. **(3 marks)**

(c) L_2 is a straight line passes through A. It is given that the equation of L_2 is $y = -\frac{5}{4}x + 2$ and it cuts L_1 at N.

(i) Find the coordinates of N.

(ii) Find the ratio of the area of ΔABM to the area of ΔABN.

(4 marks)

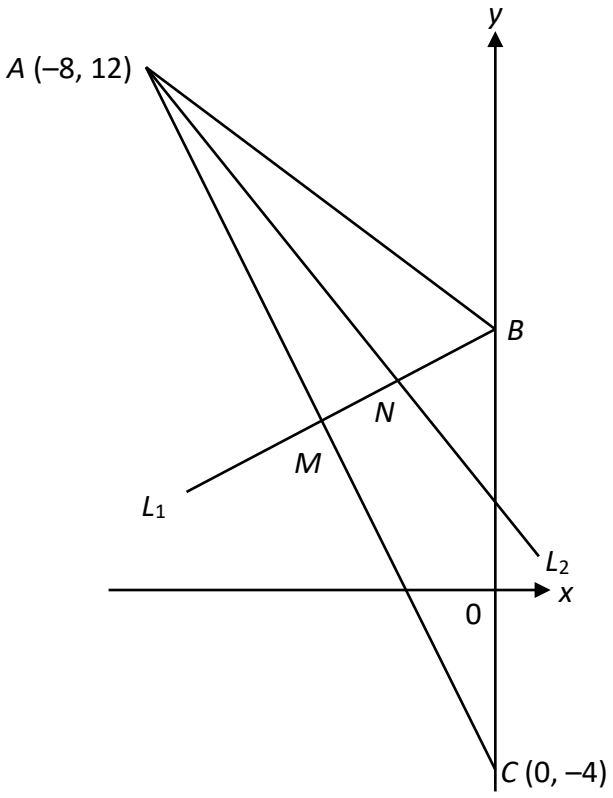


Figure 1

[21-22]

6. [S.4 21-22 Final, #6]

The slope of the straight line L_1 is $\frac{1}{3}$. The straight line L_2 passes through $A(-2,5)$ and L_1 does not intersect with L_2.

(a) Find the equation of L_2 in the general form.

(b) If L_2 passes through $P(4, k)$, find the equation of the horizontal line passing through P.

(5 marks)

7. [S.4 21-22 Final, #13]

The straight line $L_1: x + 2y - 10 = 0$ cuts the x-axis and the y-axis at A and B respectively. Another straight line L_2 passes through A and is perpendicular to L_1. L_2 cuts the y-axis at C. Denote the origin by O.

(a) Find the equation of L_2. **(2 marks)**

(b) Suppose P is a point lying on L_2 and above the x-axis such that $\angle \text{POA} = 45°$. It is given that the x-coordinate of P is h.

(i) Find h.

(ii) Find the distance between the orthocenter of ΔABC and P. Give your answer in surd form if necessary. **(4 marks)**

8. [S.5 21-22 Mid-year, #5]

The straight line $L: 5x + 3y - 30 = 0$ cuts the x-axis and the y-axis at A and B respectively.

(a) Write down the coordinates of A and B.

(b) Find the equation of the perpendicular bisector of AB. **(4 marks)**

9. [S.5 21-22 Mid-year, #18]

Let C be the graph of $y = 2x^2 - 12kx + 32k^2 + 6$, where k is a real constant.

(a) Using the method of completing the square, express the coordinates of the vertex of C in terms of k. **(3 marks)**

(b) Let L be a straight line with slope $4k$. Someone claims that if y-intercept of L is negative, then L and C must not intersect. Do you agree? Explain your answer. **(3 marks)**

10. [S.6 21-22 Standardized Test, #7]

The straight lines L_1 and L_2 are perpendicular to each other. The x-intercept of L_1 is 8. It is given that L_1 and L_2 intersect at the point (5, 2). Let R be the region (including the boundary) bounded by L_1, L_2 and the y-axis.

(a) It is given that R represents the solution of a system of inequalities. Find the system of inequalities. **(3 marks)**

(b) Peter claims the value of $-5x + 8y$, where (x, y) is a point lying in R, must be less than 43. Do you agree? Explain your answer. **(3 marks)**

[22-23]

11. [S.4 22-23 Mid-Year,#4]

The coordinates of the points P and Q are $(5, 3)$ and $(-3, 7)$ respectively. P is rotated clockwise about O through $90°$ to P', where O is the origin. Q' is the reflection image of Q with respect to the x-axis.

(a) Write down the coordinates of P' and Q'.
(b) Find the slope of $P'Q'$. **(4 marks)**

12. [S.4 22-23 Mid-Year,#8]

In **Figure 1**, the straight line L_1 passes through $A(2, 7)$ and has the slope -2.

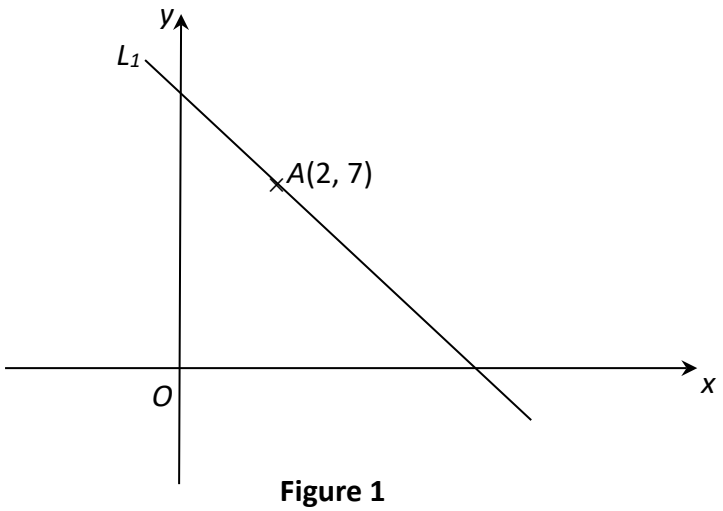


Figure 1

(a) Find the equation of L_1. **(2 marks)**

(b) If the straight line $L_2 : kx - 3y + 1 = 0$ is parallel to L_1, find the value of k.

(2 marks)

(c) L_3 is a straight line having the same y-intercept as L_2 and passes through $(-1, -3)$.
Find the equation of L_3. **(2 marks)**

13. [S.4 22-23 Mid-Year,#12]

It is given that the equation of L_1 is $2x + 5y - 2a = 0$,where a is a positive constant. L_1 cuts the x-axis and y-axis at A and B respectively. M is the mid-point of A and B.

(a) Write down the coordinates of M in terms of a.

(1 mark)

(b) L_2 is the perpendicular bisector of AB and L_2 cuts the y-axis at C. If $BC = 58$, find a.

(3 marks)

14. [S.4 22-23 Final,#7]

L_1 is a straight line with slope 2 and the y-intercept is -6.

(a) Write down the equation of L_1.

(b) L_2 is another straight line that is perpendicular to L_1. If L_1 and L_2 have the same x-intercept, find the equation of L_2. **(4 marks)**

15. [S.4 22-23 Final,#15]

It is given that y is a linear function of $\log x$. The slope and the intercept on the horizontal axis of the graph are 2 and –3 respectively. Express the relation between x and y in the form $x^k = 10^{y+A}$, where k and A are constants. **(3 marks)**

16. [S.6 22-23 Timed Practice 7,#2]

The coordinates of the point A are (2, –4). A is rotated anti-clockwise about the origin O through $90°$ to B. C is the reflection image of A with respect to the x-axis.

(a) Write down the coordinates of B and C.

(b) Determine whether BC is perpendicular to AB.

(4 marks)

[23-24]

17. [S.4 23-24 Mid-Year,#7]

The slope and the *y*-intercept of the straight line L_1 are 2 and 6 respectively.

(a) Write down the equation of L_1.

(b) L_2 is another straight line with the same *x*-intercept as L_1 and passes through $(4,5)$. Find the equation of L_2. **(3 marks)**

18. [S.4 23-24 Mid-Year,#8]

The straight line $L_1: kx-3y+6=0$, where k is a real constant, passing through $(-6,-2)$ is perpendicular to another straight line L_2.

(a) Find the value of k.

(b) If $(-1,10)$ lies on L_2, find the equation of L_2. **(5 marks)**

19. [S.4 23-24 Mid-Year,#14]

The straight line L_1: $3x-4y+24k=0$ cuts the *x*-axis and the *y*-axis at points A and B respectively, where k is a non-zero real constant. The straight line L_2: $3x+2y-30k=0$ cuts the *x*-axis at C and intersects L_1 at D.

(a) Find the coordinates of D in terms of k. **(2 marks)**

(b) A student claims that the ratio of the area of ΔBCD to the area of ΔBCA is always constant. Do you agree? Explain your answer. **(2 marks)**

20. [S.4 23-24 Final,#9]

A straight line L cuts the *y*-axis at A $(0,5)$ and passes through the point $(-3,1)$.

(a) Find the equation of L.

(b) Another straight line ℓ cuts the *y*-axis at B $(0,16)$ and is parallel to L. If ℓ cuts the *x*-axis at P, find the area of ΔABP. **(5 marks)**

21. [S.4 23-24 Final,#13]

It is given that the equations of straight lines L_1 and L_2 are $3x-2y=0$ and $y=x-4$ respectively. L is a straight line which cuts L_1 and L_2 at A and B respectively. $M(0,-3)$ is the mid-point of A and B. Let b be the x-coordinate of B, where $b>0$.

(a) Write down the y-coordinate of B in terms of b. **(1 mark)**

(b) Find the value of b. **(3 marks)**

(c) Find the inclination of L. **(2 marks)**

22. [S.4 23-24 Final,#16]

It is given that $\log_a y$ is a linear function of x, where $a>0$. The slope and the intercept on the vertical axis of the graph of the linear function are –2 and 3 respectively. If $y=64k^x$, where k is a constant, find the value of k. **(3 marks)**

23. [S.5 23-24 Mid-year,#13]

The coordinates of points A and B are $(-10,7)$ and $(-2,1)$ respectively. L is the perpendicular bisector of AB.

(a) Find the equation of L. **(3 marks)**

(b) If L cuts the x-axis and the y-axis at points P and Q respectively. Find the ratio of the area of $\triangle ABP$ to the area of $\triangle ABQ$. **(2 marks)**

24. [S.6 23-24 Timed Practice 5,#3]

The coordinates of the points A and B are (15, –8) and (–12, 9) respectively. A is rotated clockwise about the origin O through 270° to A', where O is the origin. B' is the reflection image of B with respect to the x-axis.

(a) Write down the coordinates of A' and B'.

(b) Are O, A' and B' collinear? Explain your answer.

(4 marks)

~End~