CHAPTER 1.3

Lines and Slopes

Multiple-Choice Old Exam Questions

31 questions • 5 topics • options A–E • two questions per page

Topic 1 | Slope and Basic Facts about Lines

Slope from two points, true/false statements about slope, and applications • Questions 1–6

Q 1

Which one of the following statements is FALSE?

A) $y = 5$ is an equation of a vertical line.

B) The slope of the line passing through the points $(-1, -5)$ and $(-5, -1)$ is -1.

C) A line with a negative slope falls from left to right.

D) The slope of a horizontal line is zero.

E) If the slope is positive, then the line is increasing.

Q 2

Which one of the following statements is TRUE?

A) The slope of the horizontal line passing through the point $(2, -1)$ is 0.

B) The slope of the line $x = \frac{4}{3}$ is $\frac{4}{3}$.

C) The slope of the line $2y + 3x = \frac{4}{3}$ is $\frac{3}{2}$.

D) The slope of the vertical line passing through the point $(-3, 2)$ is 2.

E) The slope of the line $y = 0$ is undefined.

Q
3

A local diner must build a wheelchair ramp to provide handicap access to the restaurant. Federal building codes require that a wheelchair ramp must have a maximum rise of 1 inch for every horizontal distance of 12 inches. If the space available to build a ramp is 120 inches wide, then the ramp reaches a height of

A) 10 inches

B) 12 inches

C) 120 inches

D) 100 inches

E) 0.1 inches

Q
4

If the slope of the line passing through the points $(k, -3)$ and $\left(-\frac{1}{2}, -2k\right)$ is $\frac{2}{3}$, then $4k =$

A) 10

B) 5

C) -10

D) -5

E) 8

Q
5

If the points $(a, -3)$, $(-4, 1)$ and $(a-3, -1)$ are collinear, then $5a - 4 =$

A) 6

B) 2

C) 26

D) -4

E) 16

Q
6

The y-intercept of the line that passes through the points $\left(\frac{3}{4}, 2\right)$ and $\left(\frac{1}{8}, -\frac{1}{2}\right)$ is equal to

A) $(0, -1)$

B) $(0, 1)$

C) $(0, -2)$

D) $(0, 2)$

E) $\left(0, -\frac{1}{2}\right)$

Topic 2 | Horizontal and Vertical Lines

Equations of horizontal and vertical lines, and lines perpendicular to them • Questions 7–12

Q **7**

The equation of the horizontal line through $(\sqrt{2}, -\sqrt{3})$ is

A) $y + \sqrt{3} = 0$

B) $x = -\sqrt{3}$

C) $y = \sqrt{2}$

D) $x - \sqrt{2} = 0$

E) $\sqrt{2}x - \sqrt{3}y = 0$

Q **8**

The equation of the vertical line through $(\sqrt{2}, -\sqrt{3})$ is

A) $y + \sqrt{3} = 0$

B) $x = -\sqrt{3}$

C) $y = \sqrt{2}$

D) $x - \sqrt{2} = 0$

E) $\sqrt{2}x - \sqrt{3}y = 0$

Q
9

The equation of the line that passes through the point $(-1, -2)$ and is perpendicular to a line with undefined slope is

A) $y = -2$

B) $x = -1$

C) $y = -1$

D) $x = -2$

E) $x + y = -2$

Q
10

The equation of the line passing through $(-3, -5)$ and perpendicular to a line with zero slope is

A) $x = -3$

B) $y = -5$

C) $y = 5$

D) $x = \frac{1}{3}$

E) $y = \frac{1}{5}$

Q
11

The equation of the line through the point $(2, -10)$ and perpendicular to a line with undefined slope is

A) $y = -10$

B) $x = 2$

C) $y = 2$

D) $x = -10$

E) $y = 10$

Q
12

If the line through the points $(-k, 5)$ and $(3, k + 1)$ is perpendicular to the line $2x + 3 = 0$, then $k =$

A) 4

B) -4

C) 5

D) 6

E) -6

Topic 3 | Parallel Lines

Using equal slopes to write equations and find unknown values • Questions 13–20

Q **13**

The equation of the line that passes through the center of the circle $(x-1)^2+(y+2)^2=5$ and is parallel to the line $y=3x-11$ is

A) $3x-y-5=0$

B) $3x-y+5=0$

C) $x-3y-5=0$

D) $x+3y-5=0$

E) $3x+y+5=0$

Q **14**

The equation of the line with x-intercept $\frac{1}{2}$ and parallel to the line $2x+3y+4=0$ is

A) $2x+3y-1=0$

B) $2x+3y+6=0$

C) $2x+3y+2=0$

D) $2x+3y=0$

E) $2x+3y+1=0$

Q
15

If $ax + by + c = 0$ is the equation of the line that passes through the point $(-1, 4)$ and is parallel to the line $3x + 2y - 6 = 0$, then $(a \cdot b) + c =$

A) 1

B) 8

C) -3

D) -11

E) -20

Q
16

The y-intercept of the line with x-intercept -2 and parallel to the line $3x + 4y = 5$ is

A) $-\frac{3}{2}$

B) $\frac{3}{2}$

C) -3

D) $\frac{5}{4}$

E) -2

Q
17

If the line $ax + by + \frac{5}{2} = 0$ with y-intercept $-\frac{5}{6}$ is parallel to the line $2x + 3y = 16$, then $a + b =$

A) 5

B) -5

C) -10

D) -8

E) 10

Q
18

If the lines $kx + 4y = 24$ and $y = -\frac{3}{k+1}x + \frac{15}{4}$ are parallel, then the set of values of k consists of:

A) one positive and one negative integer

B) two positive integers

C) two negative integers

D) one positive integer only

E) one negative integer only

Q
19

If the line passing through the points $(2,\ 6)$ and $(-4,\ k)$ is parallel to the line $2x - 3y = 4$, then k is equal to

A) 2

B) 10

C) -2

D) 4

E) 8

Q
20

If the line passing through the points $(-1,\ 4)$ and $(-4,\ k)$ is parallel to the line $x + 3y = 5$, then k is equal to

A) 5

B) 3

C) -5

D) 7

E) -3

Topic 4 | Perpendicular Lines

Using negative reciprocal slopes to write equations and find unknown values • Questions 21–26

Q **21**

The equation of the line that passes through $(2, -4)$ and is perpendicular to the line $3x - 2y = 5$ is

A) $3y + 2x = -8$

B) $2y + 3x = -2$

C) $3y + 2x = -2$

D) $2y - 3x = -14$

E) $y + 2x = 0$

Q **22**

A point that lies on the line that is perpendicular to the line $y - 2x - 1 = 0$ and passes through the point $(1, 3)$ is

A) $\left(2, \frac{5}{2}\right)$

B) $(1, 4)$

C) $(0, 1)$

D) $(-1, 3)$

E) $\left(-2, \frac{7}{2}\right)$

Q
23

The y-intercept of the line passing through the point $(2,\ 4)$ and perpendicular to the line $2x + 6y = -5$ is

A) -2

B) 2

C) $-\frac{1}{2}$

D) $\frac{1}{2}$

E) 3

Q
24

If $(0,\ b)$ is the y-intercept of the line that is perpendicular to the line $2x + 3y - 5 = 0$ and passes through the point $(2,\ -1)$, then $b =$

A) 4

B) -4

C) 2

D) -2

E) 6

Q
25

Let $k > 0$. If the line through the points $(-5, -3)$ and $(-3, k)$ is perpendicular to the line $kx + (2k + 3)y = 5$, then $k =$

A) 3

B) 1

C) 4

D) 2

E) 5

Q
26

If the line $ky - 5x = 1$ is perpendicular to the line passing through the points $(4, -1)$ and $\left(-\frac{7}{2}, 2\right)$, then k is equal to

A) 2

B) -2

C) $\frac{1}{2}$

D) 5

E) $-\frac{5}{2}$

Topic 5 | Mixed Problems and Figures

Combining slopes, perpendicularity, tangents and diagrams • Questions 27–31

Q **27**

If a and b are nonzero real numbers such that the line $ax + y = b$ is perpendicular to the line $cx + y = b + 2$, then $ac =$

A) -1

B) 1

C) 0

D) 2

E) -2

Q **28**

The equation of the line with slope -2 and passing through the points $(-1, p)$ and $(2, 3p)$ is

A) $2x + y + 5 = 0$

B) $2x + y + 7 = 0$

C) $x + 2y + 5 = 0$

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

E) $x - 2y - 5 = 0$

Q
29

Let $A(-6, -4)$, $B(0, -2)$ and $C(m, 8)$ be the vertices of a right triangle, where the right angle is at A. The value of m is

A) -10

B) 4

C) -8

D) -4

E) 6

Q
30

In the figure, the line $Ax - By = -36$ is LINE 1, which is tangent at the point $\left(-\frac{3}{2}, 1\right)$ to the circle $\left(x + \frac{1}{3}\right)^2 + \left(y + \frac{1}{4}\right)^2 = \frac{421}{144}$. Then $A + B =$

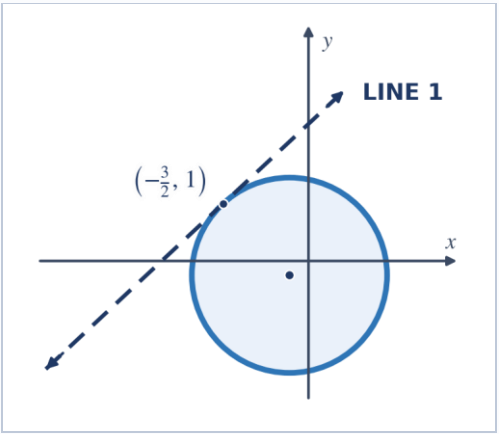
A) 29

B) -1

C) 1

D) 24

E) 36



Q
31

In the figure, if the line L_1 is perpendicular to the line L_2, then the y-intercept of L_2 is equal to

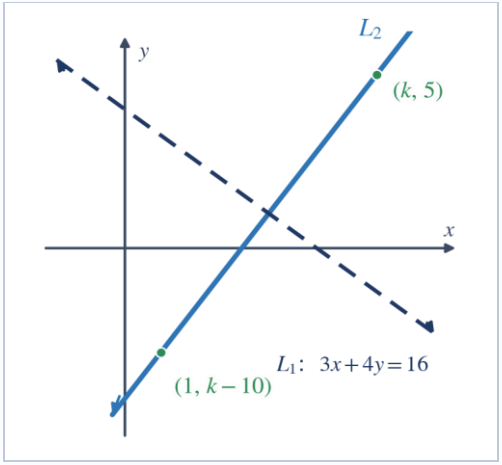
A) $-\frac{13}{3}$

B) $-\frac{16}{3}$

C) $-\frac{9}{2}$

D) -4

E) -3



Answer Key

"Original" shows the question number in the source worksheet.

Q	Original	Ans.	Value
1	18	**A**	$y = 5$ is an equation of a vertical line.
2	20	**A**	The slope of the horizontal line passing through the point $(2, -1)$ is 0.
3	30	**A**	10 inches
4	6	**A**	10
5	24	**A**	6
6	16	**A**	$(0, -1)$
7	14	**A**	$y + \sqrt{3} = 0$
8	15	**D**	$x - \sqrt{2} = 0$
9	2	**A**	$y = -2$
10	8	**A**	$x = -3$
11	17	**A**	$y = -10$
12	25	**A**	4
13	1	**A**	$3x - y - 5 = 0$
14	3	**A**	$2x + 3y - 1 = 0$
15	5	**A**	1
16	22	**A**	$-\frac{3}{2}$
17	29	**A**	5
18	10	**A**	one positive and one negative integer
19	19	**A**	2
20	21	**A**	5
21	9	**A**	$3y + 2x = -8$
22	11	**A**	$\left(2, \frac{5}{2}\right)$
23	12	**A**	-2
24	27	**B**	-4
25	4	**A**	3
26	23	**A**	2
27	28	**A**	-1
28	26	**A**	$2x + y + 5 = 0$
29	13	**A**	-10
30	7	**A**	29
31	31	**A**	$-\frac{13}{3}$