CHAPTER 1.1

Coordinate Plane, Distance and Midpoint

Multiple-Choice Old Exam Questions

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

Topic 1 | Quadrants and Intercepts

Locating points by quadrant; finding x- and y-intercepts of graphs • Questions 1–4

Q **1**

If the point (a, b) is in the second quadrant, then the point $(-a, -b)$ is in the

A) fourth quadrant

B) first quadrant

C) second quadrant

D) third quadrant

E) x-axis

Q **2**

The x-intercept and the y-intercept of the graph of $x = \sqrt{y - 1}$ are:

A) No x-intercept; the y-intercept is 1

B) The x-intercept is 1; no y-intercept

C) The x-intercept is 1; the y-intercept is 1

D) The x-intercept is 0; the y-intercept is 1

E) No x-intercept and no y-intercept

Q
3

If (m, n) is the midpoint of the line segment joining the x-intercept and the y-intercept of the graph of $y = -\sqrt{x+1}$, then $m + n =$

A) -1

B) 0

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

D) $-\frac{1}{4}$

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

Q
4

If $A(a, 0)$ is the x-intercept and $B(0, b)$ is the y-intercept of the graph of $y = \sqrt{x+4}$, then $a + b =$

A) -2

B) 2

C) -6

D) 6

E) 0

Topic 2 | Distance Formula: Expressions with Variables

Simplifying the distance between points whose coordinates contain variables • Questions 5–10

Q **5**

If $x < 0$, then the distance between the points $(2x, -x)$ and $(6x, 2x)$ is equal to

A) $-5x$

B) $5x$

C) $-7x$

D) $7x$

E) $-6x$

Q **6**

If $x < 0$, then the distance between the points $(4x, 3x)$ and $(-8x, -2x)$ is equal to

A) $-13x$

B) $13x$

C) $12x$

D) $5x$

E) $-5x$

Q
7

If $x < 0$, then the distance between the points $(5x, -2x)$ and $(-3x, 4x)$ is equal to

A) $-10x$

B) $10x$

C) $-14x$

D) $14x$

E) $-2x$

Q
8

If $y < x$, then the distance between the points $(\sqrt{3}x, y)$ and $(\sqrt{3}y, x)$ is equal to

A) $2(x - y)$

B) $2(y - x)$

C) $3(y - x)$

D) $3(x - y)$

E) $4(y - x)$

Q
9

If $b > a$, then the distance between the points $(3a, -4b)$ and $(3b, -4a)$ is equal to

A) $5(b-a)$

B) $4(b+a)$

C) $3(b-a)$

D) $2(a-b)$

E) $b-a$

Q
10

If $a < b$, then the distance between the points $(1, a)$ and $(1, 2b-a)$ is equal to

A) $2(b-a)$

B) $2(a-b)$

C) $4(a-b)$

D) $2(a+b)$

E) $2b$

Topic 3 | Distance Formula: Finding Unknown Values

Using a given distance (or equal distances) to determine a missing coordinate • Questions 11–16

Q **11**

If the point $(x, -2)$, $x > 0$, is 5 units from the point $(0, -5)$, then $3x - 1 =$

A) 11

B) 14

C) 8

D) 5

E) 20

Q **12**

If the point $(1, y)$ is 5 units from the point $(5, 2)$, then one value of y is

A) 4

B) -1

C) 3

D) 7

E) 0

Q
13

If the distance between the points $(x, 2)$ and $(2, -1)$ is 5, then all possible values of x are:

A) -2 and 6

B) 2 and -6

C) -6 and 6

D) 6 only

E) -2 only

Q
14

The sum of the values of x such that the distance between $(x, -9)$ and $(3, -5)$ is equal to 6 is

A) 6

B) -6

C) $-4\sqrt{5}$

D) $4\sqrt{5}$

E) 12

Q
15

If the distance between the points $(-x-2y,\ y-4x)$ and $(-x,\ 5y-4x)$, where $y>0$, is $\sqrt{5}$, then $y=$

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

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

C) $\frac{1}{5}$

D) $\frac{3}{4}$

E) $\frac{\sqrt{3}}{2}$

Q
16

If $(0,\ b)$ is a point on the y-axis that is equidistant (the same distance) from the points $(3,\ -3)$ and $(1,\ 1)$, then $b=$

A) -8

B) 4

C) 8

D) -2

E) 2

Topic 4 | Midpoint Formula

Finding a missing endpoint or coordinate from a given midpoint • Questions 17–22

Q **17**

If $(-2,\ 11)$ is the midpoint of the line segment joining the endpoints $(a,\ b)$ and $(4,\ -6)$, then $a + b =$

A) 20

B) 16

C) 15

D) 18

E) 21

Q **18**

If $(x,\ -2)$ is the midpoint of the line segment joining $(-6,\ y)$ and $(22,\ -16)$, then $x + y =$

A) 20

B) 8

C) 12

D) -4

E) 4

Q
19

If $(x, 2)$ is the midpoint of the line segment joining $(6, y)$ and $(4, 6)$, then $x + y$ is equal to

A) 3

B) 7

C) -3

D) 5

E) 1

Q
20

If the points (x, y) and $(-9, 9)$ are the endpoints of a line segment and the point $(-7, 6)$ is its midpoint, then $3x + 5y =$

A) 0

B) -30

C) 30

D) 15

E) -15

Q
21

If $\left(\frac{7}{4}, \frac{11}{4}\right)$ is the midpoint of a line segment with endpoints (x, y) and $\left(-\frac{1}{2}, \frac{5}{3}\right)$, then $x =$

A) 4

B) -4

C) $\frac{9}{4}$

D) $-\frac{9}{4}$

E) $-\frac{5}{8}$

Q
22

Let $M(x, y)$ be the midpoint of the line segment that joins the points $(3, 4)$ and $(k, 6)$. If $x + y = 1$, then the value of k is equal to

A) -11

B) -4

C) -6

D) 8

E) 5

Topic 5 | Mixed Applications: Midpoint, Distance, Figures and Curves

Problems that combine the midpoint and distance formulas with figures or curves • Questions 23–28

Q **23**

If $M(14,\ 11)$ is the midpoint of the line segment joining the points $A(x,\ 14)$ and $B(10,\ y)$, then the distance between the points A and B is

A) 10

B) 14

C) 100

D) 5

E) 25

Q **24**

If $(-1,\ 3)$ is the midpoint of the line segment joining the points $(a+2,\ -3)$ and $(1,\ b+2)$, then the length of the line segment is

A) $4\sqrt{10}$

B) $6\sqrt{2}$

C) 6

D) $5\sqrt{2}$

E) $6\sqrt{10}$

Q
25

Let M be the midpoint of the line segment joining $A(-2,\ 1)$ and $B(-8,\ -3)$. The distance between the point M and the point $(-2,\ 3)$ is

A) 5

B) 25

C) 7

D) $\sqrt{41}$

E) $3\sqrt{5}$

Q
26

In the figure, the segment joining $(0,\ 1)$ and $(2,\ 3)$ is a diameter of the circle with centre P. The distance between P and Q is equal to

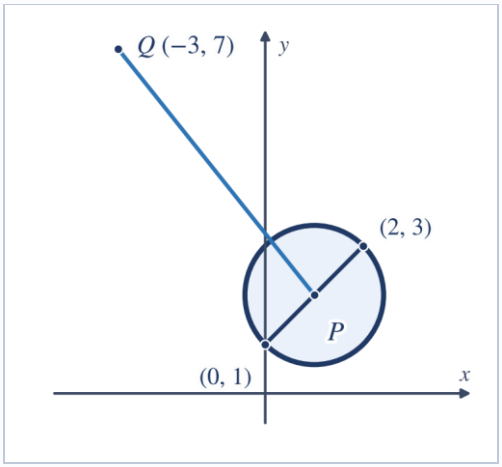
A) $\sqrt{41}$

B) 41

C) 5

D) $\sqrt{29}$

E) 9



Q
27

In the figure, if $d(B, M) = d(M, C)$ and $AM \perp BC$, then the height of the triangle (the length of AM) is equal to

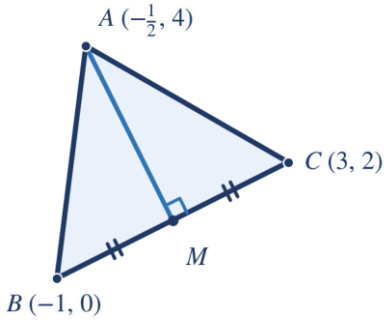
A) $\frac{3\sqrt{5}}{2}$

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

C) $\frac{2\sqrt{3}}{5}$

D) $\frac{2\sqrt{5}}{3}$

E) $\frac{9}{2}$



Q
28

If $P(a, b)$ is a point on the curve $y = x^2$ that is $\sqrt{5}$ units from the point $Q(0, 3)$, then a possible value of $a + b$ is equal to

A) 6

B) -2

C) 20

D) -4

E) 16

Answer Key

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

Q	Original	Ans.	Value
1	14	**A**	fourth quadrant
2	18	**A**	No x-intercept; the y-intercept is 1
3	1	**A**	-1
4	24	**A**	-2
5	4	**A**	$-5x$
6	9	**A**	$-13x$
7	19	**A**	$-10x$
8	2	**A**	$2(x-y)$
9	7	**A**	$5(b-a)$
10	26	**A**	$2(b-a)$
11	6	**A**	11
12	25	**B**	-1
13	20	**A**	-2 and 6
14	8	**A**	6
15	10	**A**	$\frac{1}{2}$
16	22	**D**	-2
17	3	**A**	20
18	16	**A**	20
19	21	**A**	3
20	17	**A**	0
21	13	**A**	4
22	27	**A**	-11
23	5	**A**	10
24	12	**A**	$4\sqrt{10}$
25	23	**A**	5
26	15	**A**	$\sqrt{41}$
27	11	**A**	$\frac{3\sqrt{5}}{2}$
28	28	**A**	6