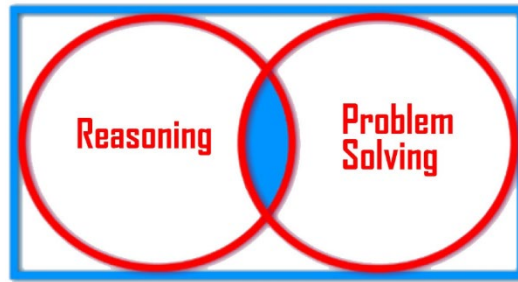


GCSE Foundation (5 – 1)



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Mathematical Reasoning Questions

Coordinates – Set 1

Solutions

The questions are repeated here for your convenience.

- 1 The coordinates of the point $A = (2a, 5b)$ and the point $B = (-4a, 13b)$
What is the midpoint of the line segment AB?
- a) $(a, 9b)$
 - b) $(-a, -9b)$
 - c) $(-a, 9b)$
 - d) $(a, -9b)$

Solution

The coordinates of the midpoint will be halfway between the points A and B

The x coordinate of the midpoint:

$$\text{This will be halfway between } -4a \text{ and } 2a = \frac{-4a+2a}{2} = -\frac{2a}{2} = -a$$

The y coordinate of midpoint:

$$\text{This will be halfway between } 5b \text{ and } 13b = \frac{5b+13b}{2} = \frac{18b}{2} = 9b$$

Therefore, the midpoint of the line AB is $(-a, 9b)$

Correct Answer: C

[2marks]

- 2 The point $A(6, -5)$ is reflected in the y -axis? What is the image of point A? Choose one answer.
- a) $(-6, -5)$
 - b) $(6, -5)$
 - c) $(-6, 5)$
 - d) $(6, 5)$

Solution

When a co-ordinate is reflected in the y -axis, the y coordinate does not but the x coordinate is multiplied by -1

Therefore, the reflection of $(6, -5)$ will be $(-6, -5)$

Correct Answer: A

[1mark]

<p>3</p>	<p>The equation of a straight line is given as $y = ax + c$ What is the gradient of the line?</p> <p>a) a b) ax c) c d) cx</p> <p style="text-align: right;"><u>Solution</u></p> <p>The gradient is the coefficient of x. Therefore, the gradient is a.</p> <p>Correct Answer: A [1mark]</p>
<p>4</p>	<p>The equation of a straight line is given as $y = ax + c$ The coordinate $(0, -6)$ lies on the line. Circle the value of c</p> <p>a) 6 b) 0 c) -6 d) $-a$</p> <p style="text-align: right;"><u>Solution</u></p> <p>Substitute the values of $x = 0$ and $y = -6$ into the equation $y = ax + c$ $-6 = a(0) + c$ $-6 = c$</p> <p>Correct Answer: C [1mark]</p>
<p>5</p>	<p>The coordinate $A = (2, n)$ lies on the line $y = 7 - 5x$ Choose the value of n</p> <p>a) 7 b) 3 c) 13 d) -3</p> <p style="text-align: right;"><u>Solution</u></p> <p>Substitute $x = 2$ into the equation $y = 7 - 5x$ $y = 7 - 5(2)$ $y = 7 - 10 = -3$ $y = -3$</p> <p>Correct Answer: D [1mark]</p>
<p>6</p>	<p>Which of the following is True about the line $y = 3$</p> <p>a) It has a gradient of 3 b) It has an x-intercept of 3 c) It has a y-intercept of 3</p> <p style="text-align: right;"><u>Solution</u></p> <p>The line $y = 3$ has a y-intercept of 3</p> <p>Correct Answer: C [1mark]</p>

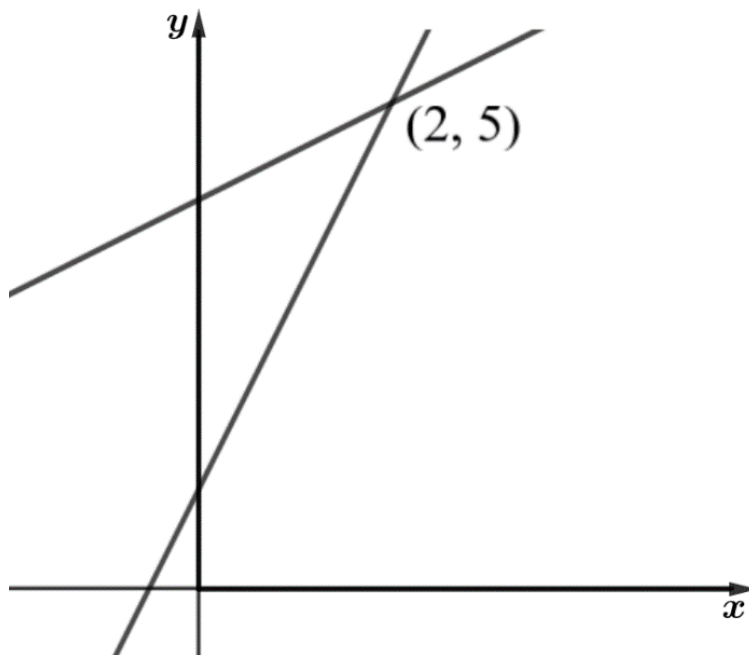
7 Which of the following is **True** about the line $x = -a$

- a) It has a y -intercept of $-a$
- b) It has an x -intercept of $-a$
- c) It has a gradient of $-a$

Solution

Correct Answer: B [1mark]

8 The diagram below shows the graphs of $y = \frac{1}{2}x + 4$ and $y = ax + 1$
The lines intersect at the point $(2, 5)$



Calculate the value of a

Solution

$y = ax + 1$ and this line passes through the point $(2, 5)$

Substitute $x = 2$ and $y = 5$ into the equation to find a

$$5 = a(2) + 1 \text{ \{Subtract 1 from both sides\}} \quad \mathbf{[1mark]}$$

$$4 = 2a \text{ \{Divide both sides by 2\}}$$

$$\text{Therefore, } a = 2 \quad \mathbf{[1mark]}$$

- 9 Find any two coordinates that lie on the line $y = -2ax + 3a$
Give your answers in terms of a
(... ..,) and (... ..,)

Solution

Choose any two different values of x and calculate their corresponding y values. For example, let $x = 0$ and substitute this value into the equation

Then, $y = -2a(0) + 3a$

Therefore, $y = 3a$ when $x = 0$

Hence, $(0, 3a)$ is a coordinate on the line

Now, let x be equal to another number. Example $x = 1$

Then, $y = -2a(1) + 3a = a$

Therefore $(1, a)$ is a coordinate on the line

So, **$(0, 3a)$ and $(1, a)$** are 2 coordinates on the line $y = -2ax + 3a$

{Or any correct pair of coordinates}

[2marks]

- 10 The equation of a line is given as $2y + x = -5$
Which of the following coordinates will lie on the line?
Choose all that apply.



- a) $(1, -3)$
- b) $(-2, -3.5)$
- c) $(2, -6.5)$
- d) $(-1, 3)$

Solution

Substitute the x and y values of the coordinates into the equation to check whether you will get a result of -5

a) $x = 1, y = -3$

Then we have $2(-3) + (1) = -5$

$-6 + 1 = -5$ {this satisfies the equation}

Therefore, the coordinate $(1, -3)$ will lie on the line

b) $x = -2, y = -3.5$

Then we have $2(-3.5) + (-2) = -7 - 2 = -9$

$-9 \neq -5$ {this does not satisfy the equation}

Therefore, the coordinate $(-2, -3.5)$ will not lie on the line

c) $x = 2, y = -6.5$

Then we have $2(-6.5) + (2) = -13 + 2$

$-13 + 2 \neq -5$ {this does not satisfy the equation}

Therefore, the coordinate $(2, -6.5)$ will not lie on the line

d) $x = -1, y = 3$

Then we have $2(3) + (-1) = 6 - 1$

$6 - 1 \neq -5$ {this doesn't satisfy the equation}

Therefore, the coordinate $(-1, 3)$ will not lie on the line

Correct Answer: A

[2marks]