2.95 Coordinates, Reflection and Translation: Test Pack

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Point P is at (4, -1). It is reflected in the line y = 0 then reflected in the line x = 1. Find the final coordinates of the image.

(2)

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2 Point A is at (3, -7). What is the y-coordinate of A?

- ☐ A) 3
- ☐ B) -7
- ☐ C) 7
- ☐ D) -3
- ☐ E) 0

---

3 Which translation maps (2, 3) to (-1, -1)?

- ☐ A) (-3, -4)
- ☐ B) (3, 4)
- ☐ C) (-1, -2)
- ☐ D) (-3, 4)
- ☐ E) (-4, -1)

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4 The point A is at (-7, 5). A is reflected in the x-axis. What are the new coordinates of A?

- ☐ A) (7, 5)
- ☐ B) (-7, -5)
- ☐ C) (5, -7)
- ☐ D) (8, 5)
- ☐ E) (7, -5)

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5 The point A is at (1, 7). A is reflected in the y-axis. What are the new coordinates of A?

- [ ] A) (-1, 7)
- [ ] B) (7, 1)
- [ ] C) (-1, -7)
- [ ] D) (0, 7)
- [ ] E) (1, -7)

---

6 The point A is at (5, 3). A is reflected in x = 2. What are the new coordinates of A?

- [ ] A) (3, 5)
- [ ] B) (-1, 3)
- [ ] C) (0, 3)
- [ ] D) (-5, 3)
- [ ] E) (-5, -3)

---

7 The point A is at (-3, -3). A is reflected in the y-axis. What are the new coordinates of A?

- [ ] A) (-3, 3)
- [ ] B) (4, -3)
- [ ] C) (-3, -3)
- [ ] D) (3, 3)
- [ ] E) (3, -3)

---

8 The point A is at (-3, -1). A is reflected in x = -2. What are the new coordinates of A?

- [ ] A) (-1, -3)
- [ ] B) (3, 1)
- [ ] C) (0, -1)
- [ ] D) (-1, -1)
- [ ] E) (3, -1)

---

9 The point A is at (6, -7). A is reflected in x = 1. What are the new coordinates of A?

- [ ] A) (-6, -7)
- [ ] B) (-7, 6)
- [ ] C) (-4, -7)
- [ ] D) (-6, 7)
- [ ] E) (6, 7)

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10 What are the coordinates of the midpoint of the line joining (2, 6) and (2, 0)?

- ☐ A) (2, 3)
- ☐ B) (0, -6)
- ☐ C) (4, 6)
- ☐ D) (3, 3)
- ☐ E) (0, 3)

---

11 What are the coordinates of the midpoint of the line joining (-8, -3) and (-12, -1)?

- ☐ A) (-20, -4)
- ☐ B) (-10, -2)
- ☐ C) (-9, -2)
- ☐ D) (-2, -10)
- ☐ E) (2, 1)

---

12 What are the coordinates of the midpoint of the line joining (-6, -1) and (2, -7)?

- ☐ A) (-2, -4)
- ☐ B) (-4, -2)
- ☐ C) (-1, -4)
- ☐ D) (-4, -8)
- ☐ E) (4, 3)

---

13 What are the coordinates of the midpoint of the line joining (8, 3) and (4, -3)?

- ☐ A) (0, 6)
- ☐ B) (6, 0)
- ☐ C) (2, 3)
- ☐ D) (12, 0)
- ☐ E) (-4, -6)

---

14 What are the coordinates of the midpoint of the line joining (-2, -7) and (-6, -1)?

- ☐ A) (-3, -4)
- ☐ B) (-8, -8)
- ☐ C) (-4, 6)
- ☐ D) (2, 3)
- ☐ E) (-4, -4)

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15 What are the coordinates of the midpoint of the line joining (-2, -2) and (-6, -4)?

- ☐ A) (2, 1)
- ☐ B) (-4, -3)
- ☐ C) (-4, -2)
- ☐ D) (-3, -4)
- ☐ E) (-8, -6)

---

16 What are the coordinates of the midpoint of the line joining (-8, 5) and (-14, 3)?

- ☐ A) (3, 1)
- ☐ B) (-10, 4)
- ☐ C) (-11, 4)
- ☐ D) (-22, 8)
- ☐ E) (4, -11)

---

17 What are the coordinates of the midpoint of the line joining (-5, -1) and (-9, 1)?

- ☐ A) (-6, 0)
- ☐ B) (0, -7)
- ☐ C) (2, 1)
- ☐ D) (-14, 0)
- ☐ E) (-7, 0)

---

18 What are the coordinates of the midpoint of the line joining (2, 8) and (4, 16)?

- ☐ A) (4, 12)
- ☐ B) (1, 4)
- ☐ C) (3, 12)
- ☐ D) (12, 3)
- ☐ E) (6, 24)

---

19 What are the coordinates of the midpoint of the line joining (5, -3) and (1, -13)?

- ☐ A) (2, 5)
- ☐ B) (-8, 3)
- ☐ C) (6, -16)
- ☐ D) (4, -8)
- ☐ E) (3, -8)

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20 What are the coordinates of the midpoint of the line joining (-8, -3) and (-6, -7)?

- ☐ A) (1, 2)
- ☐ B) (-5, -7)
- ☐ C) (-14, -10)
- ☐ D) (-7, -5)
- ☐ E) (-6, -5)

---

21 Three corners of a rectangle are at (3, 1), (6, 1) and (6, 5). What are the coordinates of the fourth corner?

- ☐ A) (4, 5)
- ☐ B) (9, 5)
- ☐ C) (3, -3)
- ☐ D) (3, 5)
- ☐ E) (5, 3)

---

22 Three corners of a rectangle are at (-4, -3), (-2, -3) and (-2, 3). What are the coordinates of the fourth corner?

- ☐ A) (0, 3)
- ☐ B) (-4, 4)
- ☐ C) (-4, 3)
- ☐ D) (-3, 3)
- ☐ E) (-4, -9)

---

23 Three corners of a rectangle are at (-4, 4), (-4, -2) and (2, -2). What are the coordinates of the fourth corner?

- ☐ A) (2, 4)
- ☐ B) (-10, 4)
- ☐ C) (3, 4)
- ☐ D) (2, -8)
- ☐ E) (2, 5)

---

24 Write the coordinates of point B if B is 4 units left of the origin and 3 units above it.

(1)

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25 The point A is at (7, 1). A is reflected in x = -1. What are the new coordinates of A?

- [ ] A) (-8, 1)
- [ ] B) (-7, -1)
- [ ] C) (1, 7)
- [ ] D) (-9, 1)
- [ ] E) (7, -1)

---

26 What are the coordinates of the midpoint of the line joining (8, -4) and (4, 2)?

- [ ] A) (2, 3)
- [ ] B) (12, -2)
- [ ] C) (-4, 6)
- [ ] D) (-1, 6)
- [ ] E) (6, -1)

---

27 The point P is at (-1, 6). P is translated 3 left and 1 down. What are the new coordinates of P?

- [ ] A) (-2, 3)
- [ ] B) (-4, 7)
- [ ] C) (-3, -1)
- [ ] D) (-4, 5)
- [ ] E) (2, 7)

---

28 Three corners of a rectangle are at (-2, 0), (2, 0) and (2, 4). What are the coordinates of the fourth corner?

- [ ] A) (4, -2)
- [ ] B) (-2, 4)
- [ ] C) (6, 4)
- [ ] D) (-2, 5)
- [ ] E) (-2, -4)

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29 Three corners of a rectangle are at (7, -5), (7, -2) and (2, -2). What are the coordinates of the fourth corner?

- [ ] A) (3, -5)
- [ ] B) (12, -5)
- [ ] C) (-5, 2)
- [ ] D) (2, 1)
- [ ] E) (2, -5)

---

30 The point P is at (0, 5). P is translated 4 left and 6 up. What are the new coordinates of P?

- [ ] A) (-4, -1)
- [ ] B) (-4, 11)
- [ ] C) (-4, 6)
- [ ] D) (6, 1)
- [ ] E) (4, -1)

---

31 The point P is at (4, -3). P is translated 5 right and 2 down. What are the new coordinates of P?

- [ ] A) (9, -5)
- [ ] B) (-1, -5)
- [ ] C) (-1, -1)
- [ ] D) (9, -1)
- [ ] E) (2, 2)

---

32 The point A is at (4, 1). A is reflected in y = -2. What are the new coordinates of A?

- [ ] A) (-4, 1)
- [ ] B) (4, -5)
- [ ] C) (1, 4)
- [ ] D) (-4, -1)
- [ ] E) (4, -1)

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33 The point A is at (6, 3). A is reflected in x = 0. What are the new coordinates of A?

- [ ] A) (-6, 3)
- [ ] B) (-6, -3)
- [ ] C) (-5, 3)
- [ ] D) (6, -3)
- [ ] E) (3, 6)

---

34 What are the coordinates of the midpoint of the line joining (-8, 0) and (-10, -4)?

- [ ] A) (-8, -2)
- [ ] B) (-18, -4)
- [ ] C) (1, 2)
- [ ] D) (-2, -4)
- [ ] E) (-9, -2)

---

35 What are the coordinates of the midpoint of the line joining (7, -4) and (17, -10)?

- [ ] A) (24, -14)
- [ ] B) (5, 3)
- [ ] C) (10, -6)
- [ ] D) (12, -7)
- [ ] E) (13, -7)

---

36 Three corners of a rectangle are at (0, 1), (0, 6) and (-2, 6). What are the coordinates of the fourth corner?

- [ ] A) (-2, 1)
- [ ] B) (-2, 11)
- [ ] C) (1, -2)
- [ ] D) (2, 1)
- [ ] E) (-2, 2)

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37 The point P is at (-4, 1). P is translated 6 right and 4 up. What are the new coordinates of P?

- [ ] A) (-10, -3)
- [ ] B) (2, -3)
- [ ] C) (0, 7)
- [ ] D) (6, 4)
- [ ] E) (2, 5)

---

38 The point P is at (5, 5). P is translated 2 left and 5 down. What are the new coordinates of P?

- [ ] A) (3, 0)
- [ ] B) (7, 10)
- [ ] C) (3, 10)
- [ ] D) (0, 3)
- [ ] E) (-2, -5)

---

39 The point A is at (4, 4). A is reflected in the y-axis. What are the new coordinates of A?

- [ ] A) (4, -4)
- [ ] B) (4, 4)
- [ ] C) (-4, 4)
- [ ] D) (-4, -4)
- [ ] E) (-3, 4)

---

40 The point A is at (5, 1). A is reflected in the y-axis. What are the new coordinates of A?

- [ ] A) (-5, 1)
- [ ] B) (-5, -1)
- [ ] C) (5, -1)
- [ ] D) (1, 5)
- [ ] E) (-4, 1)

---

41 Which of the following points lies in quadrant III?

- [ ] A) (2, -5)
- [ ] B) (-4, 3)
- [ ] C) (-3, -2)
- [ ] D) (0, -1)
- [ ] E) (5, 0)

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42 The point A is at (4, 5). A is reflected in the x-axis. What are the new coordinates of A?

- [ ] A) (4, -5)
- [ ] B) (-3, 5)
- [ ] C) (-4, -5)
- [ ] D) (-4, 5)
- [ ] E) (5, 4)

---

43 The point A is at (5, -2). A is reflected in the y-axis. What are the new coordinates of A?

- [ ] A) (-4, -2)
- [ ] B) (5, 2)
- [ ] C) (-5, 2)
- [ ] D) (-5, -2)
- [ ] E) (-2, 5)

---

44 The point A is at (-1, -3). A is reflected in the x-axis. What are the new coordinates of A?

- [ ] A) (1, 3)
- [ ] B) (-3, -1)
- [ ] C) (-1, 3)
- [ ] D) (2, -3)
- [ ] E) (1, -3)

---

45 The point A is at (1, 2). A is reflected in the y-axis. What are the new coordinates of A?

- [ ] A) (2, 1)
- [ ] B) (-1, -2)
- [ ] C) (1, -2)
- [ ] D) (-1, 2)
- [ ] E) (0, 2)

---

46 What are the coordinates of the midpoint of the line joining (-4, -3) and (0, 3)?

- [ ] A) (-2, 0)
- [ ] B) (-4, 0)
- [ ] C) (-1, 0)
- [ ] D) (4, 6)
- [ ] E) (2, 3)

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47 Reflect point D(4, -7) in the y-axis. Give the coordinates of the image.

(1)

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48 Three corners of a rectangle are at (0, -2), (3, -2) and (3, 4). What are the coordinates of the fourth corner?

- ☐ A) (0, 4)
- ☐ B) (4, 0)
- ☐ C) (0, -8)
- ☐ D) (6, 4)
- ☐ E) (0, 5)

---

49 The point P is at (4, -4). P is translated 5 left and 6 down. What are the new coordinates of P?

- ☐ A) (-1, -10)
- ☐ B) (9, 2)
- ☐ C) (-5, -6)
- ☐ D) (9, -10)
- ☐ E) (-2, -9)

---

50 The point P is at (-2, 4). P is translated 3 right and 3 up. What are the new coordinates of P?

- ☐ A) (-5, 1)
- ☐ B) (1, 1)
- ☐ C) (3, 3)
- ☐ D) (-5, 7)
- ☐ E) (1, 7)

---

51 The point P is at (-2, 7). P is translated 4 right and 1 up. What are the new coordinates of P?

- ☐ A) (-6, 6)
- ☐ B) (2, 8)
- ☐ C) (4, 1)
- ☐ D) (2, 6)
- ☐ E) (-1, 11)

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52 The point P is at (-4, -3). P is translated 5 left and 1 up. What are the new coordinates of P?

- ☐ A) (1, -4)
- ☐ B) (-3, -8)
- ☐ C) (-9, -4)
- ☐ D) (-9, -2)
- ☐ E) (1, -2)

---

53 The point P is at (-5, -6). P is translated 5 left and 5 up. What are the new coordinates of P?

- ☐ A) (0, -11)
- ☐ B) (0, -1)
- ☐ C) (-5, 5)
- ☐ D) (-10, -11)
- ☐ E) (-10, -1)

---

54 The point P is at (5, 8). P is translated 1 left and 7 up. What are the new coordinates of P?

- ☐ A) (-1, 7)
- ☐ B) (12, 7)
- ☐ C) (4, 15)
- ☐ D) (4, 1)
- ☐ E) (6, 1)

---

55 A square has vertices (2,2), (5,2), (5,5), (2,5). The square is reflected in the y-axis and then translated by (-1, 0). Find the coordinates of the image of the vertex (2,5).

(2)

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56 A point (x, y) is reflected in the x-axis and then in the y-axis. The final image is (6, -4). What were the original coordinates?

(2)

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57 Points A and B are A(2, -1) and B(-3, 4). Work out the midpoint of AB.

(2)

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Mark scheme · 2.95 Coordinates, Reflection and Translation: Test Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

Method: reflect in y=0 to change sign of y, then reflect in x=1 using x_{new} = 2*1 - x — **M1**

(-2, 1) cao — **A1**

Answer: (-2, 1). Work: reflect in y=0 gives (4,1). Reflect in x=1: x' = 2*1 - 4 = -2, y' = 1.

Question 2

correct option B (-7) cao — **B1**

Answer: B) -7 (the y-coordinate is -7). (1 mark.) A pupil who picks A or D has confused x and y; C has wrong sign; E is wrong column value only.)

Question 3

correct option A ((-3, -4)) cao — **B1**

Answer: A) (-3, -4). Work: (-1 - 2, -1 - 3) = (-3, -4). Distractors: B is sign error; C arithmetic error; D changes y sign incorrectly; E swaps components.

Question 4

correct option B ((-7, -5)) cao — **B1**

Answer: B) (-7, -5)

Question 5

correct option A ((-1, 7)) cao — **B1**

Answer: A) (-1, 7)

Question 6

correct option B ((-1, 3)) cao — **B1**

Answer: B) (-1, 3)

Question 7

correct option E ((3, -3)) cao — **B1**

Answer: E) (3, -3)

Question 8

correct option D ((-1, -1)) cao — **B1**

Answer: D) (-1, -1)

Question 9

correct option C ((-4, -7)) cao — **B1**

Answer: C) (-4, -7)

Question 10

correct option A ((2, 3)) cao — **B1**

Answer: A) (2, 3)

Question 11

correct option B ((-10, -2)) cao — **B1**

Answer: B) (-10, -2)

Question 12

correct option A ((-2, -4)) cao — **B1**

Answer: A) (-2, -4)

Question 13

correct option B ((6, 0)) cao — **B1**

Answer: B) (6, 0)

Question 14

correct option E ((-4, -4)) cao — **B1**

Answer: E) (-4, -4)

Question 15

correct option B ((-4, -3)) cao — **B1**

Answer: B) (-4, -3)

Question 16

correct option C ((-11, 4)) cao — **B1**

Answer: C) (-11, 4)

Question 17

correct option E ((-7, 0)) cao — **B1**

Answer: E) (-7, 0)

Question 18

correct option C ((3, 12)) cao — **B1**

Answer: C) (3, 12)

Question 19

correct option E ((3, -8)) cao — **B1**

Answer: E) (3, -8)

Question 20

correct option D ((-7, -5)) cao — **B1**

Answer: D) (-7, -5)

Question 21

correct option D ((3, 5)) cao — **B1**

Answer: D) (3, 5)

Question 22

correct option C ((-4, 3)) cao — **B1**

Answer: C) (-4, 3)

Question 23

correct option A ((2, 4)) cao — **B1**

Answer: A) (2, 4)

Question 24

(-4, 3) cao — **B1**

Answer: (-4, 3)

Question 25

correct option D ((-9, 1)) cao — **B1**

Answer: D) (-9, 1)

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Question 26

correct option E ((6, -1)) cao **B1**

Answer: E) (6, -1)

Question 27

correct option D ((-4, 5)) cao **B1**

Answer: D) (-4, 5)

Question 28

correct option B ((-2, 4)) cao **B1**

Answer: B) (-2, 4)

Question 29

correct option E ((2, -5)) cao **B1**

Answer: E) (2, -5)

Question 30

correct option B ((-4, 11)) cao **B1**

Answer: B) (-4, 11)

Question 31

correct option A ((9, -5)) cao **B1**

Answer: A) (9, -5)

Question 32

correct option B ((4, -5)) cao **B1**

Answer: B) (4, -5)

Question 33

correct option A ((-6, 3)) cao **B1**

Answer: A) (-6, 3)

Question 34

correct option E ((-9, -2)) cao **B1**

Answer: E) (-9, -2)

Question 35

correct option D ((12, -7)) cao **B1**

Answer: D) (12, -7)

Question 36

correct option A ((-2, 1)) cao **B1**

Answer: A) (-2, 1)

Question 37

correct option E ((2, 5)) cao **B1**

Answer: E) (2, 5)

Question 38

correct option A ((3, 0)) cao **B1**

Answer: A) (3, 0)

Question 39

correct option C ((-4, 4)) cao **B1**

Answer: C) (-4, 4)

Question 40

correct option A ((-5, 1)) cao **B1**

Answer: A) (-5, 1)

Question 41

correct option C ((-3, -2)) cao **B1**

Answer: C) (-3, -2). Quadrant III has $x < 0$ and $y < 0$. (Options A and D have $x \geq 0$; B has $y > 0$; E lies on the x-axis.)

Question 42

correct option A ((4, -5)) cao **B1**

Answer: A) (4, -5)

Question 43

correct option D ((-5, -2)) cao **B1**

Answer: D) (-5, -2)

Question 44

correct option C ((-1, 3)) cao **B1**

Answer: C) (-1, 3)

Question 45

correct option D ((-1, 2)) cao **B1**

Answer: D) (-1, 2)

Question 46

correct option A ((-2, 0)) cao **B1**

Answer: A) (-2, 0)

Question 47

(-4, -7) cao **B1**

Answer: (-4, -7). Reflection in the y-axis changes x to its negative; y stays the same.

Question 48

correct option A ((0, 4)) cao **B1**

Answer: A) (0, 4)

Question 49

correct option A ((-1, -10)) cao **B1**

Answer: A) (-1, -10)

Question 50

correct option E ((1, 7)) cao **B1**

Answer: E) (1, 7)

Question 51

correct option B ((2, 8)) cao **B1**

Answer: B) (2, 8)

Question 52

correct option D ((-9, -2)) cao **B1**

Answer: D) (-9, -2)

Question 53

correct option E ((-10, -1)) cao **B1**

Answer: E) (-10, -1)

Question 54

correct option C ((4, 15)) cao **B1**

Answer: C) (4, 15)

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Question 55

Reflect then translate method applied to the vertex, e.g. (2,5) -> (-2,5) -> (-3,5)	**M1**
(-3, 5) cao	**A1**

Answer: (-3, 5). Reflect (2,5) in y-axis to get (-2,5), then add (-1,0) to get (-3,5).

Question 56

Method: track sign changes or reverse reflections, e.g. after two reflections image is (-x, -y) so set equal to (6, -4)	**M1**
(-6, 4) cao	**A1**

Answer: (-6, 4). Reason: reflection in x then y gives (-x, -y) = (6, -4) so x = -6, y = 4.

Question 57

Correct method: average x-values and average y-values ((2 + -3)/2, (-1 + 4)/2) seen	**M1**
(-0.5, 1.5) cao	**A1**

Answer: (-0.5, 1.5). Working: x-mid = (2 + (-3))/2 = -1/2 = -0.5; y-mid = (-1 + 4)/2 = 3/2 = 1.5.

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