Coordinates, patterns and graphs - topic test

15 questions | 36 marks | 45 minutes

A progressive paper covering coordinates, pattern rules and graph interpretation.

Equivalent correct methods earn the corresponding marks.

1. In (x, y), which coordinate records horizontal position? [1 mark]

The first coordinate is horizontal.

Answer: x.

2. Which quadrant contains $(-4, -2)$? [1 mark]

Both coordinates are negative.

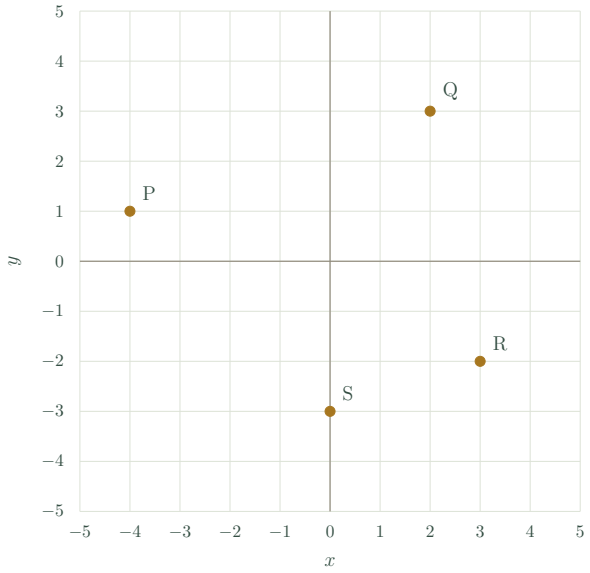
Answer: Quadrant III.

3. Which axis contains $(0, 5)$? [1 mark]

$x = 0$.

Answer: The y-axis.

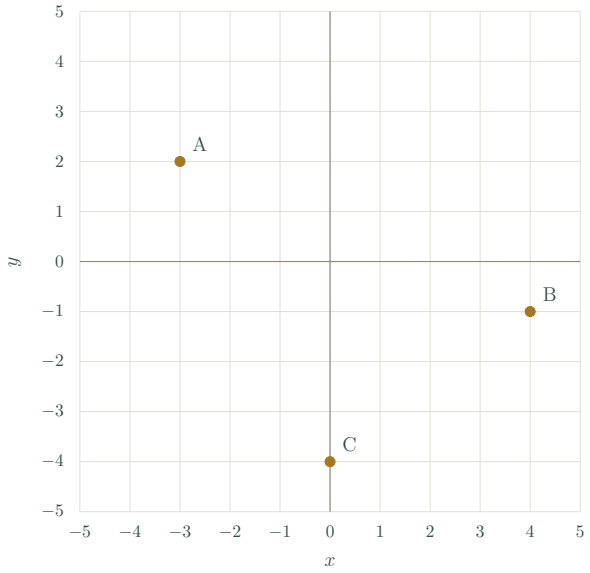
4. Read Q and S in the supplied grid. [2 marks]



Read horizontal position before vertical position.

Answer: $Q = (2, 3)$; $S = (0, -3)$.

5. Plot $A=(-3,2)$, $B=(4,-1)$ and $C=(0,-4)$. [3 marks]



Use x first, then y.

C is on the y-axis.

Answer: $A=(-3,2)$; $B=(4,-1)$; $C=(0,-4)$.

6. For $y=4n+1$, find outputs at $n=0,1,2$. [3 marks]

$4\times0+1=1$.

$4\times1+1=5$.

$4\times2+1=9$.

Answer: 1,5,9.

7. A constant-addition table has outputs 5,8,11 at inputs 1,2,3. Give a simple rule and the output at input 6. [3 marks]

The output change is 3 per step.

At $n = 1$, add 2 to $3n$.

$3 \times 6 + 2 = 20$.

Answer: $y = 3n + 2$; output 20.

8. How many matchsticks are at stage 5 of the pictured square train? Explain. [3 marks]



Stage 1 Stage 2 Stage 3

The first square uses 4; the next four add 3 each.

$4 + 4 \times 3 = 16$.

Answer: 16 matchsticks.

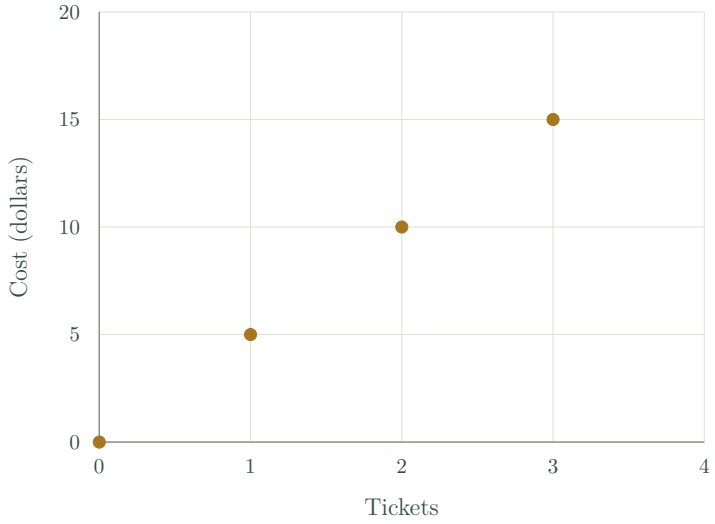
9. A pattern has 7 dots at stage 1 and adds 4 each stage. Find stage 6. [2 marks]

There are five increases.

$7 + 5 \times 4 = 27$.

Answer: 27 dots.

10. Whole museum tickets cost 5 dollars each. Plot costs for 0,1,2,3 tickets. [3 marks]



Multiply each count by 5.

Only whole-ticket inputs are permitted.

Answer: $(0,0),(1,5),(2,10),(3,15)$, as separate points.

11. Classify each input as discrete or continuous. [2 marks]

(a) Number of whole books bought. [1 mark]

Only whole-number counts are possible.

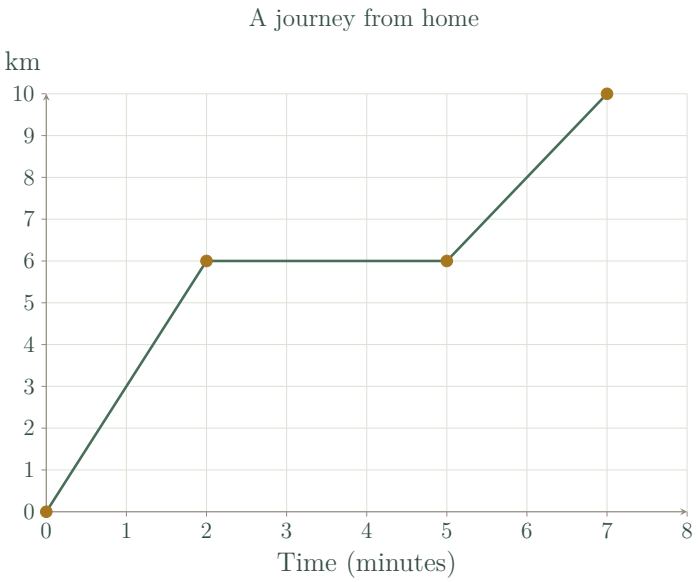
Answer: Discrete.

(b) Elapsed time while a tank fills steadily. [1 mark]

Intermediate times are possible.

Answer: Continuous.

12. Use the supplied journey log. [3 marks]



Journey log supplied for this example

Time (min)	Distance from home (km)
0	0
2	6
5	6
7	10

(a) Give the distance from home at minute 2. [1 mark]

The pair is $(2, 6)$.

Answer: 6 km.

(b) How long does the distance remain at 6 km? [2 marks]

It remains there from minute 2 to minute 5.

$5 - 2 = 3$.

Answer: 3 minutes.

13. Cooling readings are 75,62,54,49°C at times 0,2,4,6 min. Identify the greatest two-minute fall and its interval. [3 marks]

Falls are 13,8,5°C.

Compare them because the time intervals are equal.

Answer: 13°C during 0-2 minutes.

14. Give a purchase example showing why not every plotted set should be joined. [2 marks]

A line would include fractions of a ticket that cannot be bought in the situation.

Answer: For example, a whole-ticket cost graph should use whole-ticket points.

15. Find a simple multiply-then-add rule matching $(1,5),(2,7),(3,9)$, then find the input giving output 21. [4 marks]

Output increases by 2 per input step.

At $n=1$ add 3 to $2n$.

$2n+3=21$ gives $n=9$.

Answer: $y=2n+3$; input 9.