

Name:

Exam Style Questions

Invariant Points



Equipment needed: Pencil, ruler, tracing paper

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

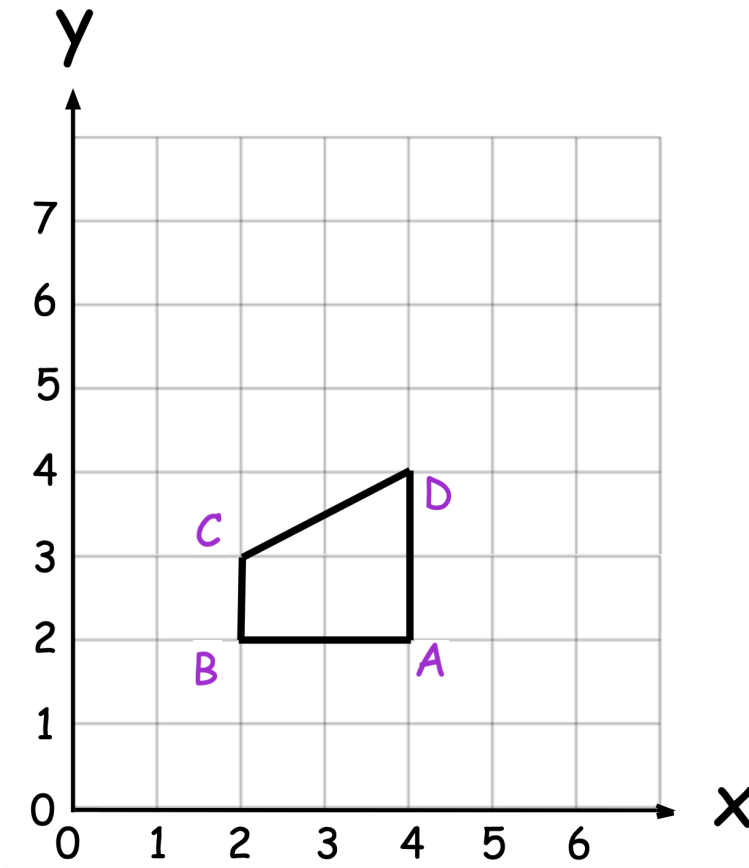
Video 392



Answers and Video Solutions



1. Shown below is trapezium ABCD.



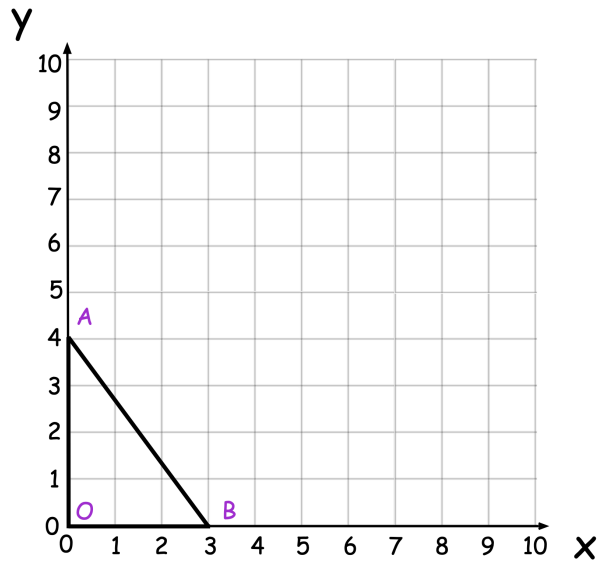
(a) Reflect trapezium ABCD in the line $y = 4$

(1)

(b) Write down the coordinates of the invariant point.

.....
(1)

2. Triangle OAB is shown below.

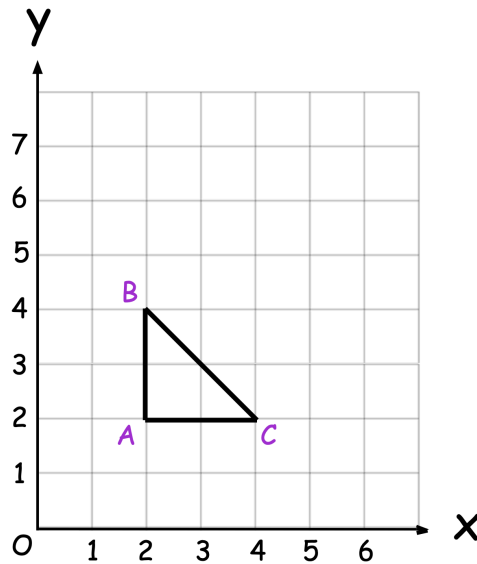


OAB is enlarged by scale factor 2, using the origin as the centre of enlargement.

How many invariant points are there?

.....
(1)

3. Triangle ABC is shown below.



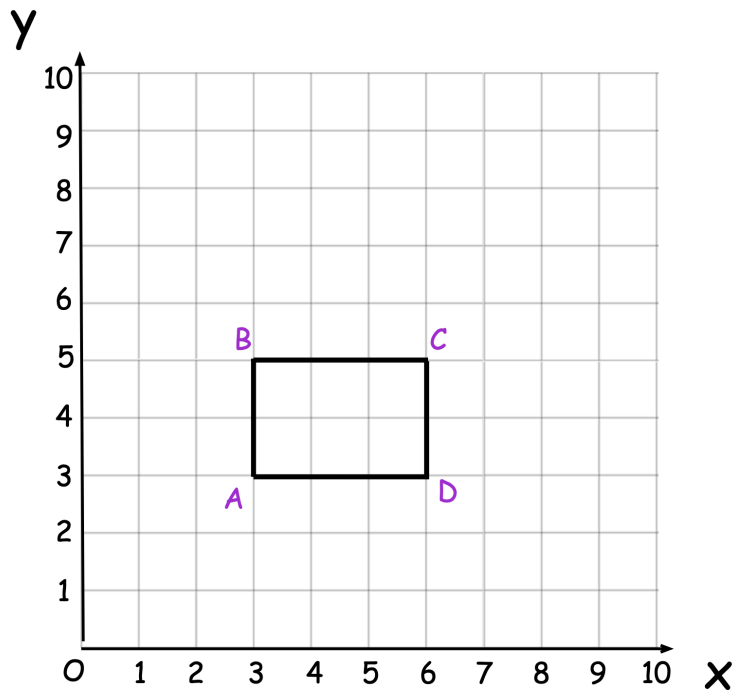
ABC is reflected in a line.
A and C are invariant points.

Circle the equation of the line.

- $x = 2$ $x = 3$ $y = 2$ $y = 3$

(1)

4. Rectangle ABCD is shown below.



Describe a single transformation of the rectangle so that B is the only invariant point.

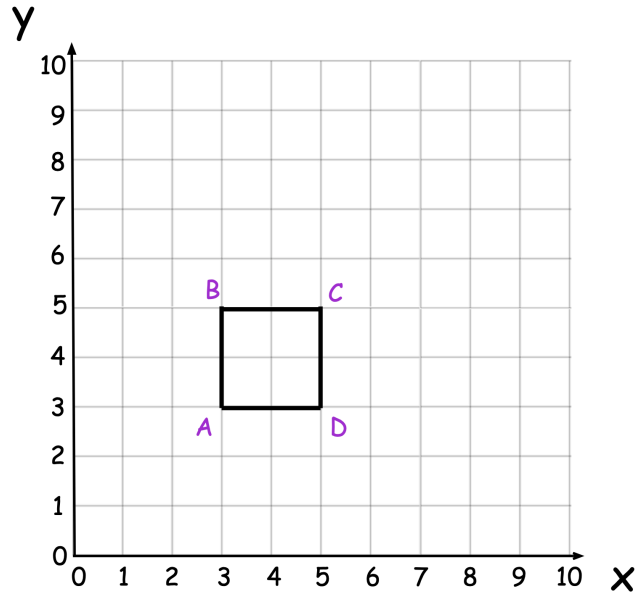
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(2)

5. ABCD is a square.

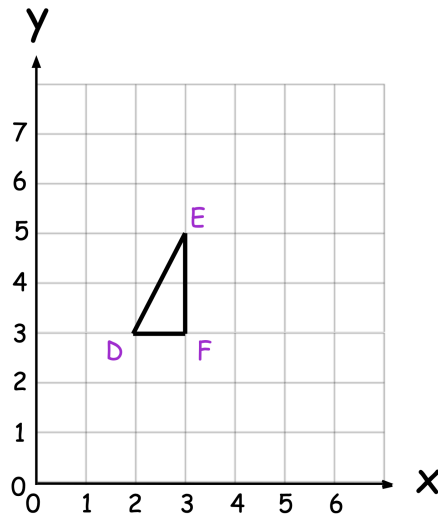


ABCD is reflected in the line $y = x$

Write down the number of invariant points.

.....
(1)

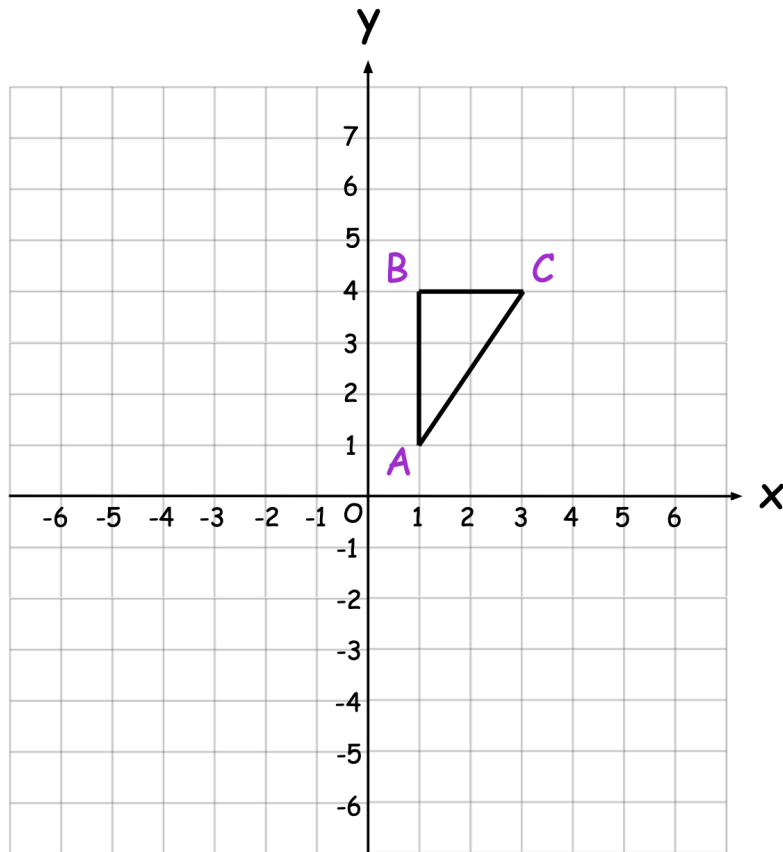
6. Triangle DEF is shown below.



Describe a single transformation of the triangle so that all the points on EF are invariant.

.....
.....
(2)

7. Shown below is triangle ABC.



ABC is transformed to $A'B'C'$ by reflection in the line $y = -1$

$A'B'C'$ is transformed to $A''B''C''$ by a translation using vector $\begin{pmatrix} 0 \\ 4 \end{pmatrix}$

Which one point on ABC is invariant under the combined transformation?
Show $A'B'C'$ and $A''B''C''$ on the grid.

.....
(3)

8. Gavin translates a trapezium using vector $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$



He says that there is an invariant point.

Explain why Gavin must be incorrect.

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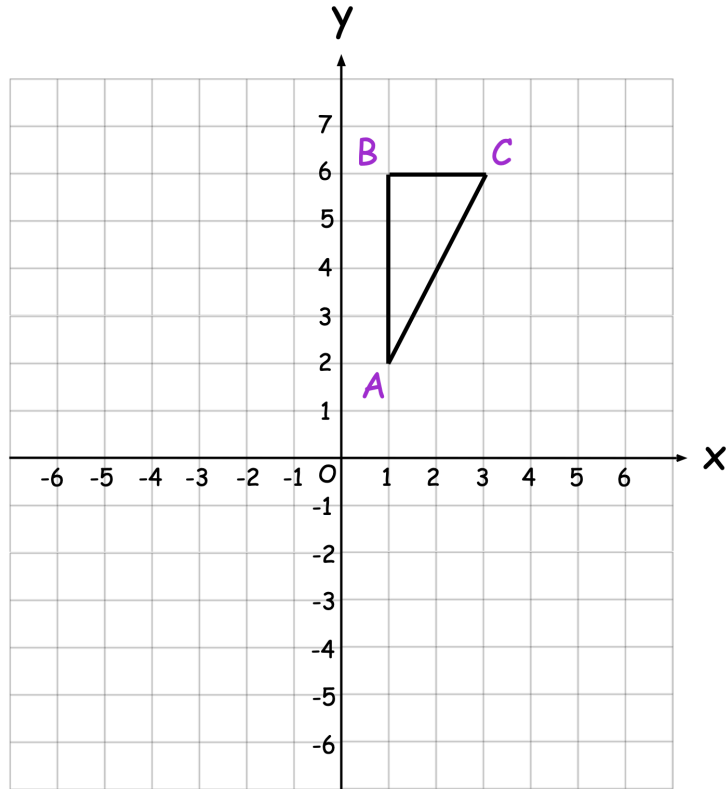
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(2)

9. Triangle ABC is shown on the grid below.



Describe a single transformation of the triangle such that

the point A is invariant

the point B moves to $(1, -2)$

the point C moves to $(-1, -2)$

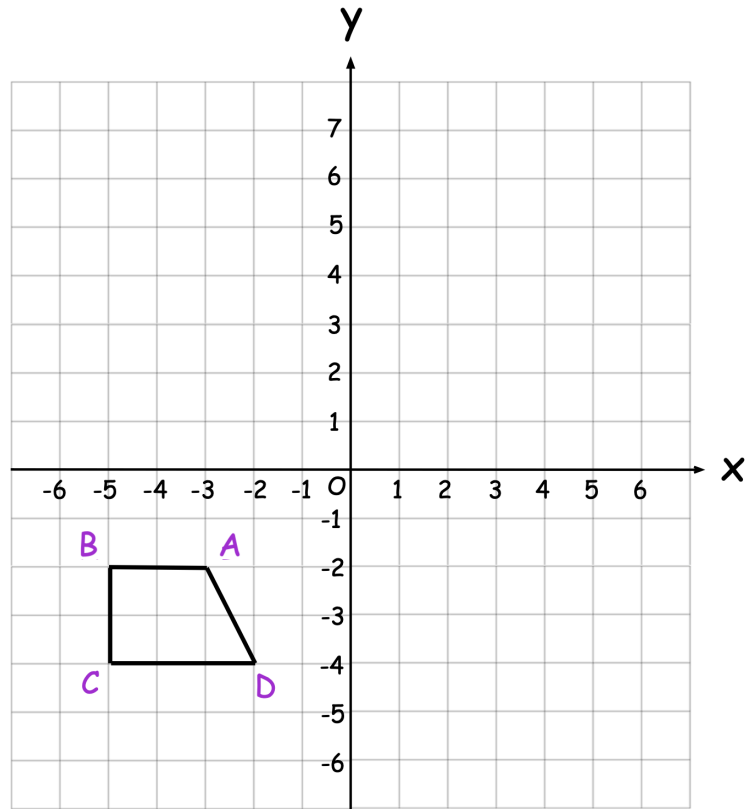
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.....

(3)

10.



Trapezium $ABCD$ is transformed to $A'B'C'D'$ by a reflection in the line $y = -x$

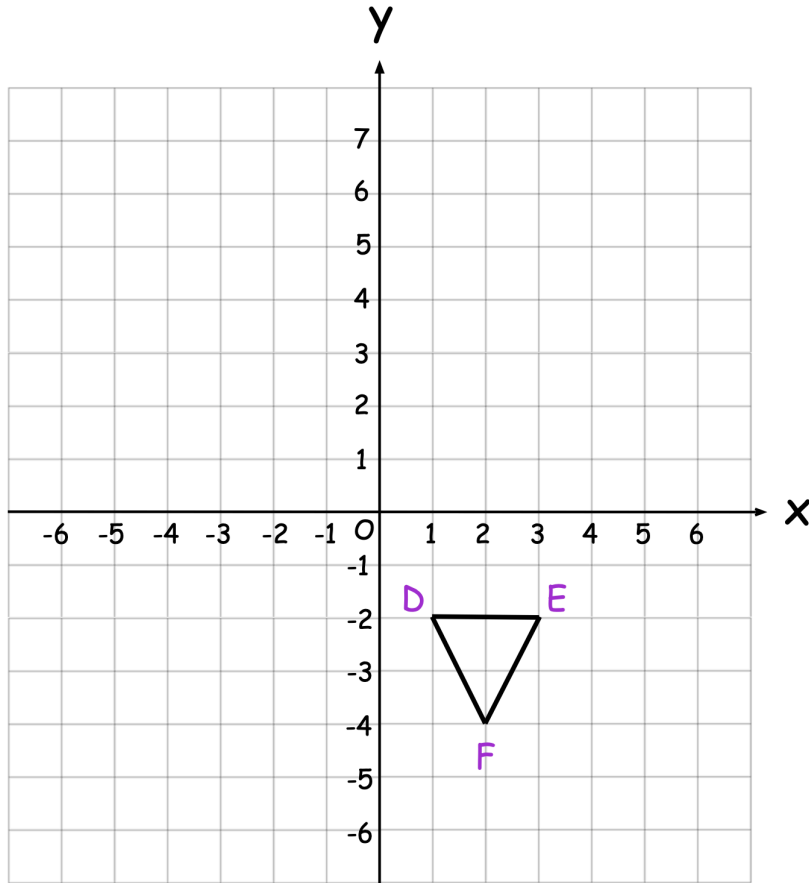
$A'B'C'D'$ is transformed to $A''B''C''D''$ by a translation.

Vertex D is invariant under the combined transformation.

Write down the translation vector.

.....
(3)

11. Shown below is triangle DEF.



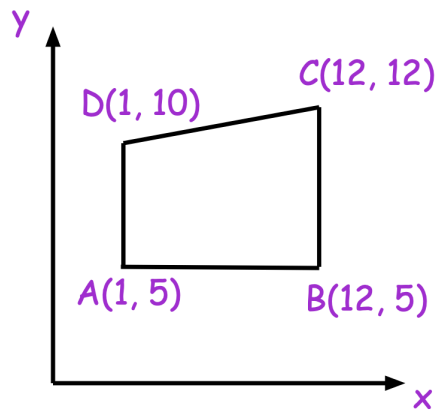
DEF is transformed to $D'E'F'$ by reflection in the line $y = x$

$D'E'F'$ is transformed to $D''E''F''$ by a rotation 90° clockwise about $(-4, -4)$

Which one point on DEF is invariant under the combined transformation?
Show $D'E'F'$ and $D''E''F''$ on the grid.

.....
(3)

12. A sketch of Trapezium ABCD is shown below.

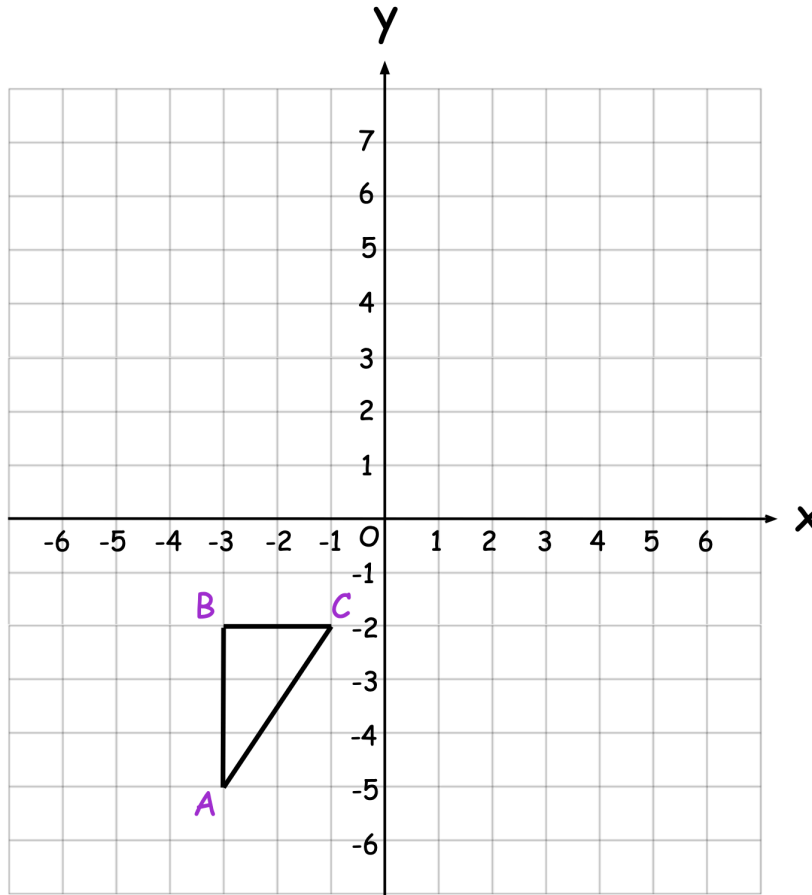


ABCD is reflected in the line $y = x$

Write down the coordinates of any invariant points.

.....
(2)

13. Shown is triangle ABC.



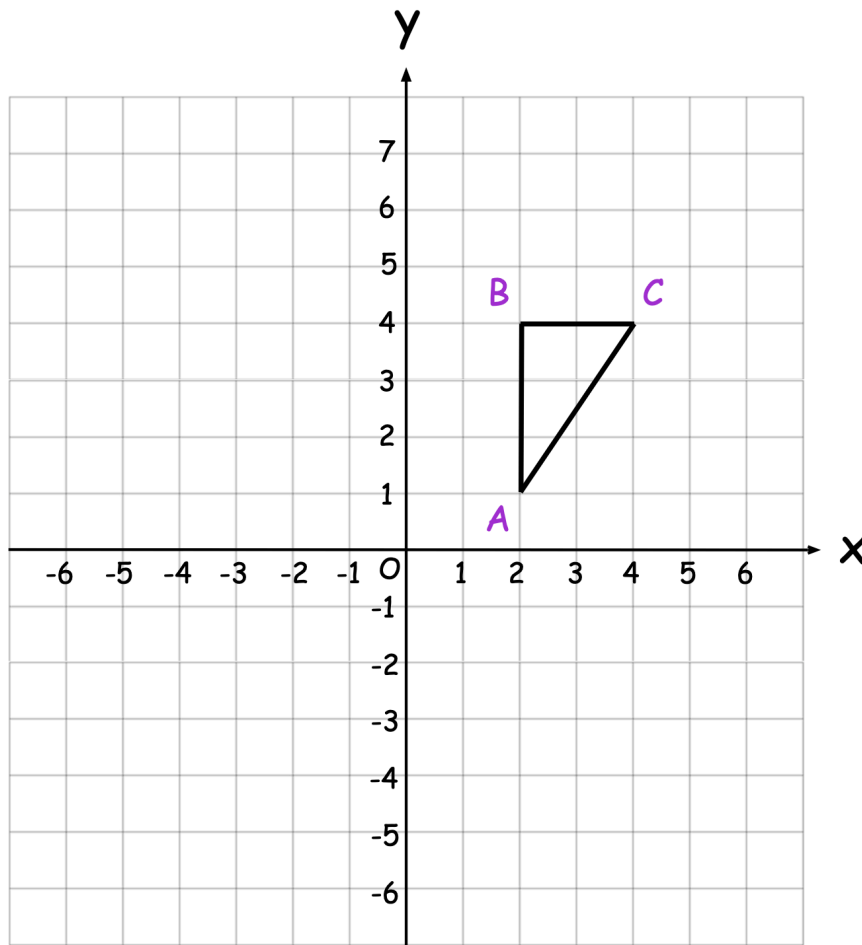
ABC is rotated 180° about the point $(0, 1)$

and then translated by the vector $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$

Write down the coordinates of the invariant point.

.....
(3)

14. Shown below is triangle ABC.



Triangle ABC is reflected in the line $y = -1$ and then rotated.

Vertex C is invariant.

Describe fully a possible rotation.

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(2)