

# MYSTERY PICTURE



## UNDEFINED TERMS, POSTULATES AND THEOREMS

### Undefined Term, Definition, Postulate or Theorem?

25 statements · one word each · is the word right?

FREE

|                                                                                                                            |                                                                                                                           |                                                                                                                                                     |                                                                                                                                                    |                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <p><sup>1</sup> If B is between A and C, then <math>AB + BC = AC</math>.<br/>Word: <b>postulate</b></p>                    | <p><sup>2</sup> If two angles are vertical angles, then they have equal measure.<br/>Word: <b>definition</b></p>          | <p><sup>3</sup> Two angles are complementary when their measures add to 90.<br/>Word: <b>theorem</b></p>                                            | <p><sup>4</sup> If two congruent angles form a linear pair, then each one is a right angle.<br/>Word: <b>postulate</b></p>                         | <p><sup>5</sup> The word <i>point</i><br/>Word: <b>definition</b></p>                                                     |
| <p><sup>6</sup> Vertical angles have equal measure.<br/>Word: <b>theorem</b></p>                                           | <p><sup>7</sup> If two angles are complementary, then their measures add to 90.<br/>Word: <b>definition</b></p>           | <p><sup>8</sup> <math>\angle 1</math> and <math>\angle 2</math> are complementary. This is the Given of one problem.<br/>Word: <b>postulate</b></p> | <p><sup>9</sup> If P is inside <math>\angle AOC</math>, then <math>m\angle AOP + m\angle POC = m\angle AOC</math>.<br/>Word: <b>definition</b></p> | <p><sup>10</sup> If <math>a = b</math>, then <math>a - c = b - c</math>.<br/>Word: <b>theorem</b></p>                     |
| <p><sup>11</sup> The word <i>plane</i><br/>Word: <b>undefined term</b></p>                                                 | <p><sup>12</sup> If two congruent angles form a linear pair, then each one is a right angle.<br/>Word: <b>theorem</b></p> | <p><sup>13</sup> Two equal amounts can take each other's place in any line of a proof.<br/>Word: <b>postulate</b></p>                               | <p><sup>14</sup> If B is between A and C, then <math>AB + BC = AC</math>.<br/>Word: <b>theorem</b></p>                                             | <p><sup>15</sup> The midpoint of a segment is the point that cuts it into two equal parts.<br/>Word: <b>postulate</b></p> |
| <p><sup>16</sup> The midpoint of a segment is the point that cuts it into two equal parts.<br/>Word: <b>definition</b></p> | <p><sup>17</sup> Two angles are supplementary when their measures add to 180.<br/>Word: <b>definition</b></p>             | <p><sup>18</sup> If P is inside <math>\angle AOC</math>, then <math>m\angle AOP + m\angle POC = m\angle AOC</math>.<br/>Word: <b>postulate</b></p>  | <p><sup>19</sup> The word <i>point</i><br/>Word: <b>undefined term</b></p>                                                                         | <p><sup>20</sup> Vertical angles have equal measure.<br/>Word: <b>postulate</b></p>                                       |
| <p><sup>21</sup> If two angles have equal measure, then they are congruent.<br/>Word: <b>definition</b></p>                | <p><sup>22</sup> Two angles that are complementary to the same angle have equal measure.<br/>Word: <b>theorem</b></p>     | <p><sup>23</sup> The word <i>line</i><br/>Word: <b>undefined term</b></p>                                                                           | <p><sup>24</sup> If <math>a = b</math>, then <math>a - c = b - c</math>.<br/>Word: <b>postulate</b></p>                                            | <p><sup>25</sup> If an angle measures 90, then it is a right angle.<br/>Word: <b>definition</b></p>                       |

# Mystery Picture — how to run it

20–25 minutes

1. **Give each student page 3.**
2. **Say this once:** *“Each square has a statement and a word. If the word is right, fill the square with slanted lines. If it is wrong, leave the square white. Use the box at the top.”*
3. **Let them work.** Nothing else is needed.

**Picture** page 3, one per student. It explains the four words and lists the theorems proved so far.  
**Answers** page 4 — yours.

**Fifteen squares are filled when every answer is right, and they make a staircase.** A square filled by mistake, or left white by mistake, shows as a gap or an extra square at the edge of the picture.

**Each white square shows a common mix-up.** A theorem is called a postulate because it seems obvious or small. A postulate is called a theorem because it is true or important. A definition is called a theorem, or a theorem is called a definition. The undefined term *point* is called a definition. A Given is called a postulate. Seven statements appear twice on the sheet, once with the right word and once with a wrong one.

**The sheet does not ask about “Linear pairs are supplementary.” This is on purpose.** Some books prove it as a theorem, and others accept it as a postulate. So no single word is right for every class.

**The box at the top of the student's sheet lists every theorem the sheet uses.** So a student can check any statement from the page alone. On this sheet, a statement is a theorem only if it is in that list.



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# Mystery Picture — which kind of statement?

Four words

Name \_\_\_\_\_

Period \_\_\_\_\_

Date \_\_\_\_\_

Each square has a statement from this course and one word. Is the word right for that statement? If yes, fill the square with slanted lines. If no, leave it white. Use the box below to decide.

**Undefined term:** a word the course uses but never builds out of other words. In this course: *point, line, plane*.  
**Definition:** gives one word its meaning, using words we already have. It could have been agreed another way.  
**Postulate:** a statement the course accepts without proof. Other books call it an *axiom* or an *assumption*.  
**Theorem:** a statement the course proves. Every theorem on this sheet is in this list of what the course has proved so far:

- Vertical angles have equal measure.
- Two angles that are complementary to the same angle have equal measure.
- If two congruent angles form a linear pair, then each one is a right angle.

**A Given is none of the four.** It is true only in its own problem.

|                                                                                                            |                                                                                                           |                                                                                                                |                                                                                                                |                                                                                                           |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 1<br>If B is between A and C, then $AB + BC = AC$ .<br>Word: <b>postulate</b>                              | 2<br>If two angles are vertical angles, then they have equal measure.<br>Word: <b>definition</b>          | 3<br>Two angles are complementary when their measures add to 90.<br>Word: <b>theorem</b>                       | 4<br>If two congruent angles form a linear pair, then each one is a right angle.<br>Word: <b>postulate</b>     | 5<br>The word <i>point</i><br>Word: <b>definition</b>                                                     |
| 6<br>Vertical angles have equal measure.<br>Word: <b>theorem</b>                                           | 7<br>If two angles are complementary, then their measures add to 90.<br>Word: <b>definition</b>           | 8<br>$\angle 1$ and $\angle 2$ are complementary. This is the Given of one problem.<br>Word: <b>postulate</b>  | 9<br>If P is inside $\angle AOC$ , then $m\angle AOP + m\angle POC = m\angle AOC$ .<br>Word: <b>definition</b> | 10<br>If $a = b$ , then $a - c = b - c$ .<br>Word: <b>theorem</b>                                         |
| 11<br>The word <i>plane</i><br>Word: <b>undefined term</b>                                                 | 12<br>If two congruent angles form a linear pair, then each one is a right angle.<br>Word: <b>theorem</b> | 13<br>Two equal amounts can take each other's place in any line of a proof.<br>Word: <b>postulate</b>          | 14<br>If B is between A and C, then $AB + BC = AC$ .<br>Word: <b>theorem</b>                                   | 15<br>The midpoint of a segment is the point that cuts it into two equal parts.<br>Word: <b>postulate</b> |
| 16<br>The midpoint of a segment is the point that cuts it into two equal parts.<br>Word: <b>definition</b> | 17<br>Two angles are supplementary when their measures add to 180.<br>Word: <b>definition</b>             | 18<br>If P is inside $\angle AOC$ , then $m\angle AOP + m\angle POC = m\angle AOC$ .<br>Word: <b>postulate</b> | 19<br>The word <i>point</i><br>Word: <b>undefined term</b>                                                     | 20<br>Vertical angles have equal measure.<br>Word: <b>postulate</b>                                       |
| 21<br>If two angles have equal measure, then they are congruent.<br>Word: <b>definition</b>                | 22<br>Two angles that are complementary to the same angle have equal measure.<br>Word: <b>theorem</b>     | 23<br>The word <i>line</i><br>Word: <b>undefined term</b>                                                      | 24<br>If $a = b$ , then $a - c = b - c$ .<br>Word: <b>postulate</b>                                            | 25<br>If an angle measures 90, then it is a right angle.<br>Word: <b>definition</b>                       |

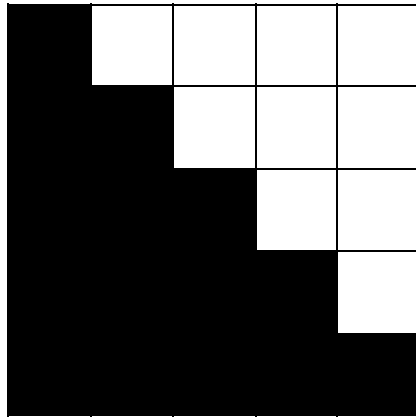
When you finish, look at the picture. If part of it is missing, or one square does not fit, check that square again.



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# Mystery Picture — answers

For the teacher



A staircase: fifteen squares filled.

| Square | Statement                                                                      | Word           | Right or wrong?                                      |
|--------|--------------------------------------------------------------------------------|----------------|------------------------------------------------------|
| 1      | If B is between A and C, then $AB + BC = AC$ .                                 | postulate      | <b>Right. Fill.</b>                                  |
| 2      | If two angles are vertical angles, then they have equal measure.               | definition     | Wrong. Leave white. It is a theorem.                 |
| 3      | Two angles are complementary when their measures add to 90.                    | theorem        | Wrong. Leave white. It is a definition.              |
| 4      | If two congruent angles form a linear pair, then each one is a right angle.    | postulate      | Wrong. Leave white. It is a theorem.                 |
| 5      | The word <i>point</i>                                                          | definition     | Wrong. Leave white. It is an undefined term.         |
| 6      | Vertical angles have equal measure.                                            | theorem        | <b>Right. Fill.</b>                                  |
| 7      | If two angles are complementary, then their measures add to 90.                | definition     | <b>Right. Fill.</b>                                  |
| 8      | $\angle 1$ and $\angle 2$ are complementary. This is the Given of one problem. | postulate      | Wrong. Leave white. It is a Given, none of the four. |
| 9      | If P is inside $\angle AOC$ , then $m\angle AOP + m\angle POC = m\angle AOC$ . | definition     | Wrong. Leave white. It is a postulate.               |
| 10     | If $a = b$ , then $a - c = b - c$ .                                            | theorem        | Wrong. Leave white. It is a postulate.               |
| 11     | The word <i>plane</i>                                                          | undefined term | <b>Right. Fill.</b>                                  |
| 12     | If two congruent angles form a linear pair, then each one is a right angle.    | theorem        | <b>Right. Fill.</b>                                  |
| 13     | Two equal amounts can take each other's place in any line of a proof.          | postulate      | <b>Right. Fill.</b>                                  |
| 14     | If B is between A and C, then $AB + BC = AC$ .                                 | theorem        | Wrong. Leave white. It is a postulate.               |
| 15     | The midpoint of a segment is the point that cuts it into two equal parts.      | postulate      | Wrong. Leave white. It is a definition.              |
| 16     | The midpoint of a segment is the point that cuts it into two equal parts.      | definition     | <b>Right. Fill.</b>                                  |
| 17     | Two angles are supplementary when their measures add to 180.                   | definition     | <b>Right. Fill.</b>                                  |
| 18     | If P is inside $\angle AOC$ , then $m\angle AOP + m\angle POC = m\angle AOC$ . | postulate      | <b>Right. Fill.</b>                                  |
| 19     | The word <i>point</i>                                                          | undefined term | <b>Right. Fill.</b>                                  |
| 20     | Vertical angles have equal measure.                                            | postulate      | Wrong. Leave white. It is a theorem.                 |
| 21     | If two angles have equal measure, then they are congruent.                     | definition     | <b>Right. Fill.</b>                                  |
| 22     | Two angles that are complementary to the same angle have equal measure.        | theorem        | <b>Right. Fill.</b>                                  |
| 23     | The word <i>line</i>                                                           | undefined term | <b>Right. Fill.</b>                                  |
| 24     | If $a = b$ , then $a - c = b - c$ .                                            | postulate      | <b>Right. Fill.</b>                                  |
| 25     | If an angle measures 90, then it is a right angle.                             | definition     | <b>Right. Fill.</b>                                  |