

Complementary and Supplementary Angles

Name: _____

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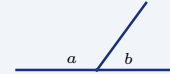
Quick Review and Helpful Hints

Two angles are *complementary* if they add up to 90° , and *supplementary* if they add up to 180° . To find a missing angle, subtract the known angle from 90° (complementary) or from 180° (supplementary).

▷ **Example:** Find the angle complementary to 35° .

Work: Complementary angles total 90° , so subtract the known angle: $90 - 35$.

★ **Answer:** 55°



On a straight line, $a + b = 180^\circ$ (supplementary).

◆ Practice Problems

Find each requested angle.

1. Complement of 40°

2. Complement of 65°

3. Supplement of 110°

4. Supplement of 45°

5. Complement of 18°

6. Supplement of 90°

7. Complement of 30°

8. Supplement of 130°

9. Complement of 75°

10. Supplement of 25°

11. Complement of 12°

12. Supplement of 160°

13. Complement of 55°

14. Supplement of 72°

◆ Word Problems

15. Two angles are complementary. One measures 28° . What is the other?

16. Two angles are supplementary. One measures 95° . What is the other?

17. A ramp makes a 22° angle with the ground. What complementary angle does it make with a vertical wall?

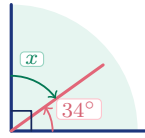
18. Two angles form a straight line. One measures 137° . Find the other.



◆ Illustrated Practice

Use each picture. Decide whether the angles add to 90° or 180° , then find the missing value.

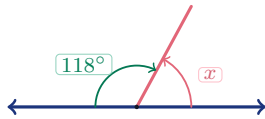
19. The two angles make a right angle. Find x .



24. The two marked angles make a straight angle. Find x .



20. The two angles form a straight line. Find x .



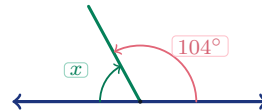
25. The right angle is split into 46° and $(x + 12)^\circ$. Find x .



21. The corner is split into two complementary angles. Find x .



26. The angles are supplementary. One angle is 104° . Find x .



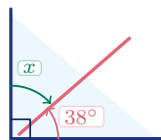
22. The two adjacent angles are supplementary. Find x .



27. The two expressions are complementary. Find x .



23. A ladder, wall, and floor make a right angle. The ladder makes 38° with the floor. Find x .



28. The two expressions are supplementary. Find x .





Answer Keys

- | | | |
|-----------------|-----------------|----------------|
| 1. 50° | 11. 78° | 21. $x = 20$ |
| 2. 25° | 12. 20° | 22. $x = 30$ |
| 3. 70° | 13. 35° | 23. 52° |
| 4. 135° | 14. 108° | 24. $x = 25$ |
| 5. 72° | 15. 62° | 25. $x = 32$ |
| 6. 90° | 16. 85° | 26. 76° |
| 7. 60° | 17. 68° | 27. $x = 17$ |
| 8. 50° | 18. 43° | 28. $x = 24$ |
| 9. 15° | 19. 56° | |
| 10. 155° | 20. 62° | |

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Complementary angles add up to 90° , so subtract the known angle: $90 - 40 = 50^\circ$. So the final answer is 50° .
2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract from 90° : $90 - 65 = 25^\circ$. So the final answer is 25° .
3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Supplementary angles add up to 180° , so subtract: $180 - 110 = 70^\circ$. So the final answer is 70° .
4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract from 180° : $180 - 45 = 135^\circ$. So the final answer is 135° .
5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 90° : $90 - 18 = 72^\circ$. So the final answer is 72° .
6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 180° : $180 - 90 = 90^\circ$. So the final answer is 90° .
7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 90° : $90 - 30 = 60^\circ$. So the final answer is 60° .
8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 180° : $180 - 130 = 50^\circ$. So the final answer is 50° .
9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 90° : $90 - 75 = 15^\circ$. So the final answer is 15° .
10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 180° : $180 - 25 = 155^\circ$. So the final answer is 155° .
11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 90° : $90 - 12 = 78^\circ$. So the final answer is 78° .
12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 180° : $180 - 160 = 20^\circ$. So the final answer is 20° .
13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 90° : $90 - 55 = 35^\circ$. So the final answer is 35° .
14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is From 180° : $180 - 72 = 108^\circ$. So the final answer is 108° .
15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Complementary angles total 90° , so the other is $90 - 28 = 62^\circ$. So the final answer is 62° .
16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Supplementary angles total 180° , so the other is $180 - 95 = 85^\circ$. So the final answer is 85° .
17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The ground and the vertical wall meet at 90° , so the wall angle is the complement: $90 - 22 = 68^\circ$. So the final answer is 68° .
18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A straight line is 180° , so the other angle is $180 - 137 = 43^\circ$. So the final answer is 43° .
19. In the picture, the square corner tells us the whole angle is 90° . The known part is 34° , so the missing part is $90 - 34 = 56^\circ$. So the final answer is 56° .
20. The two angles sit on a straight line, which means they are supplementary and must total 180° . Subtract the known angle: $180 - 118 = 62^\circ$. So the final answer is 62° .
21. The right-angle mark means the two pieces add to 90° . Write $(2x + 14) + 36 = 90$, combine to get $2x + 50 = 90$, then subtract 50 and divide by 2, so $x = 20$.
22. Because the angles form a straight line, their sum is 180° . Set up $(3x + 18) + 72 = 180$, so $3x + 90 = 180$; subtract 90 to get $3x = 90$, and divide by 3 to get $x = 30$.
23. The wall and floor form a 90° corner, so the ladder splits that right angle into two complementary angles. The floor angle is 38° , so the wall angle is $90 - 38 = 52^\circ$.
24. The two marked angles are on a straight line, so they must add to 180° . Write $(4x + 10) + (2x + 20) = 180$, combine to get $6x + 30 = 180$, then $6x = 150$, so $x = 25$.
25. The picture shows a right angle, so the two pieces add to 90° . Write $46 + (x + 12) = 90$, combine to get $x + 58 = 90$, then subtract 58 to get $x = 32$.
26. Supplementary angles make a straight line and total 180° . Since one angle is 104° , the other is $180 - 104 = 76^\circ$.
27. The square corner tells us the two expressions are complementary. Set up $2x + (3x + 5) = 90$, combine like terms to get $5x + 5 = 90$, then subtract 5 and divide by 5, so $x = 17$.
28. The two expressions form a straight angle, so their sum is 180° . Write $(4x + 12) + (2x + 24) = 180$, combine to get $6x + 36 = 180$, then $6x = 144$, so $x = 24$.



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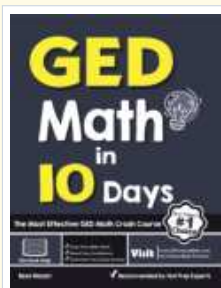
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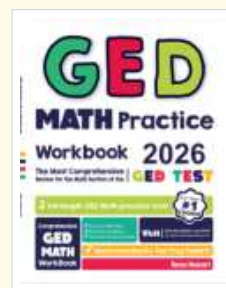
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