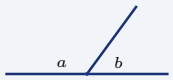
Complementary and Supplementary Angles

Name: _____	Date: _____	Score: _____ / 28

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, $a + b = 180°$ (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 $72°$ _____

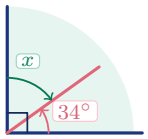
Word Problems

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.



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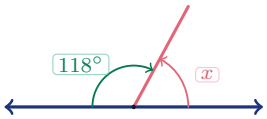
20. The two angles form a straight line. Find x.



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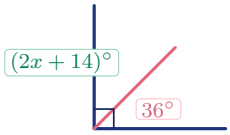
21. The corner is split into two complementary angles. Find x.



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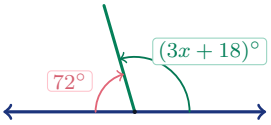
22. The two adjacent angles are supplementary. Find x.



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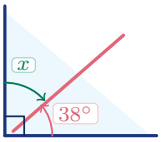
23. A ladder, wall, and floor make a right angle. The ladder makes 38° with the floor. Find x.



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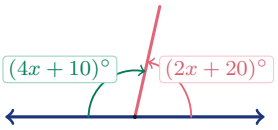
24. The two marked angles make a straight angle. Find x.



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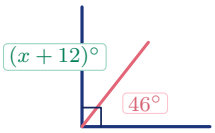
25. The right angle is split into 46° and $(x + 12)^\circ$. Find x.



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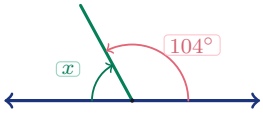
26. The angles are supplementary. One angle is 104°. Find x.



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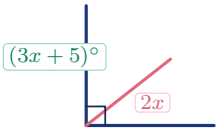
27. The two expressions are complementary. Find x.



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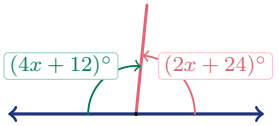
28. The two expressions are supplementary. Find x.



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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: $90 - 40 = 50°$. 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 $90°$: $90 - 65 = 25°$. 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: $180 - 110 = 70°$. 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 $180°$: $180 - 45 = 135°$. 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 $90°$: $90 - 18 = 72°$. 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 $180°$: $180 - 90 = 90°$. 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 $90°$: $90 - 30 = 60°$. 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 $180°$: $180 - 130 = 50°$. 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 $90°$: $90 - 75 = 15°$. 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 $180°$: $180 - 25 = 155°$. 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 $90°$: $90 - 12 = 78°$. 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 $180°$: $180 - 160 = 20°$. 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 $90°$: $90 - 55 = 35°$. 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 $180°$: $180 - 72 = 108°$. 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 $90 - 28 = 62°$. 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 $180 - 95 = 85°$. 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: $90 - 22 = 68°$. 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 $180 - 137 = 43°$. 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 $90 - 34 = 56°$. 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: $180 - 118 = 62°$. 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 $90 - 38 = 52°$.

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 $180 - 104 = 76°$.

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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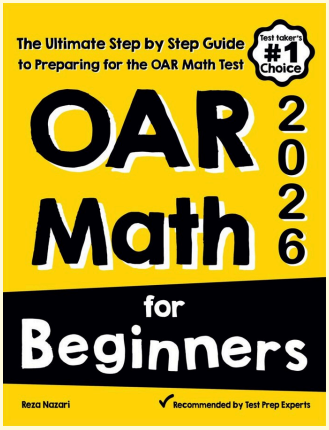

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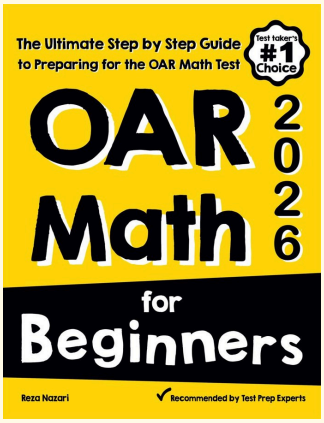

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