

Angle Relationships

Name: _____ Date: _____ Score: _____ / 24

Q Quick Review

Some angle pairs come up again and again. **Complementary** angles add to 90° ; **supplementary** angles add to 180° . **Vertical angles** — the opposite angles formed by two crossing lines — are always *equal*. **Adjacent angles** on a straight line are supplementary (a *linear pair*). All the angles around a single point add up to 360° . Spotting which relationship you have lets you set up a quick equation and solve for the missing angle.

◊ **Example:** Two angles are supplementary. One measures 115° . Find the other.
 ⇒ “Supplementary” is the keyword — it means the two angles add up to 180° . So if one angle is 115° , the other must be whatever’s left: $180^\circ - 115^\circ = 65^\circ$. A good check: $115 + 65 = 180$, exactly a straight angle.

Answer: 65°

PRACTICE

Find the missing angle measure.

- | | | | |
|---------------------------------------------------|-------|---------------------------------------------------------------|-------|
| 1. Complement of 30° | _____ | 12. Angles around a point: $90^\circ, 120^\circ, 60^\circ, ?$ | _____ |
| 2. Complement of 45° | _____ | 13. Two complementary angles: x and $4x$. Find x . | _____ |
| 3. Complement of 72° | _____ | 14. Two supplementary angles: x and $5x$. Find x . | _____ |
| 4. Complement of 15° | _____ | 15. Supplementary: x and $x + 40$. Find x . | _____ |
| 5. Supplement of 100° | _____ | 16. Complementary: $2x$ and $x + 30$. Find x . | _____ |
| 6. Supplement of 45° | _____ | 17. Vertical angles: $3x$ and 75° . Find x . | _____ |
| 7. Supplement of 90° | _____ | 18. Linear pair: $4x$ and $2x$. Find x . | _____ |
| 8. Supplement of 135° | _____ | 19. Two angles form a right angle: 38° and ? | _____ |
| 9. Vertical angle to 62° | _____ | 20. Angles around a point: $4x$. Find x . | _____ |
| 10. Vertical angle to 118° | _____ | | |
| 11. Linear pair: one angle is 73° . Other? | _____ | | |

◆ Word Problems

21. A drawbridge arm makes a 58° angle with the deck. The angle between the arm and the vertical post is complementary to it. Find that angle. _____
22. A road forks so that the two paths and the original road form a linear pair. One path makes a 124° angle with the road. What angle does the other path make? _____
23. Two streets cross. One of the four angles formed measures 108° . What is the measure of the angle directly across from it? _____
24. Around a center point, a pie chart is split into four sectors. Three of them measure $90^\circ, 130^\circ, \text{ and } 50^\circ$. What is the measure of the fourth sector? _____



Answer Keys

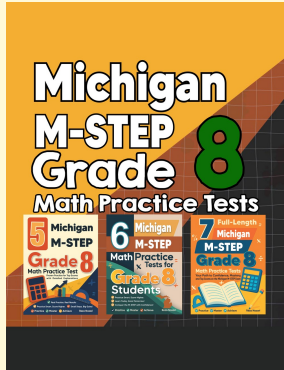
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| 1. <input type="text" value="60°"/> | 13. <input type="text" value="18°"/> |
| 2. <input type="text" value="45°"/> | 14. <input type="text" value="30°"/> |
| 3. <input type="text" value="18°"/> | 15. <input type="text" value="70°"/> |
| 4. <input type="text" value="75°"/> | 16. <input type="text" value="20°"/> |
| 5. <input type="text" value="80°"/> | 17. <input type="text" value="25°"/> |
| 6. <input type="text" value="135°"/> | 18. <input type="text" value="30°"/> |
| 7. <input type="text" value="90°"/> | 19. <input type="text" value="52°"/> |
| 8. <input type="text" value="45°"/> | 20. <input type="text" value="90°"/> |
| 9. <input type="text" value="62°"/> | 21. <input type="text" value="32°"/> |
| 10. <input type="text" value="118°"/> | 22. <input type="text" value="56°"/> |
| 11. <input type="text" value="107°"/> | 23. <input type="text" value="108°"/> |
| 12. <input type="text" value="90°"/> | 24. <input type="text" value="90°"/> |

Step-by-Step Explanations

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| <p>1. Complementary angles add to 90°: $90 - 30 = 60^\circ$.</p> <p>2. $90 - 45 = 45^\circ$.</p> <p>3. $90 - 72 = 18^\circ$.</p> <p>4. $90 - 15 = 75^\circ$.</p> <p>5. Supplementary angles add to 180°: $180 - 100 = 80^\circ$.</p> <p>6. $180 - 45 = 135^\circ$.</p> <p>7. $180 - 90 = 90^\circ$.</p> <p>8. $180 - 135 = 45^\circ$.</p> <p>9. Vertical angles are equal.</p> <p>10. Vertical angles are equal.</p> <p>11. A linear pair is supplementary: $180 - 73 = 107^\circ$.</p> <p>12. Angles around a point sum to 360°: $360 - 90 - 120 - 60 = 90^\circ$.</p> <p>13. $x + 4x = 5x = 90$, so $x = 18^\circ$.</p> | <p>14. $x + 5x = 6x = 180$, so $x = 30^\circ$.</p> <p>15. $x + x + 40 = 180$, so $2x = 140$ and $x = 70^\circ$.</p> <p>16. $2x + x + 30 = 90$, so $3x = 60$ and $x = 20^\circ$.</p> <p>17. Vertical angles are equal: $3x = 75$, so $x = 25^\circ$.</p> <p>18. $4x + 2x = 6x = 180$, so $x = 30^\circ$.</p> <p>19. They are complementary: $90 - 38 = 52^\circ$.</p> <p>20. $4x = 360$, so $x = 90^\circ$.</p> <p>21. Complementary angles add to 90°, so the angle is $90 - 58 = 32^\circ$.</p> <p>22. A linear pair is supplementary, so the other angle is $180 - 124 = 56^\circ$.</p> <p>23. The angle directly across is a vertical angle, and vertical angles are always equal, so it is 108°.</p> <p>24. Angles around a point sum to 360°, so the fourth is $360 - 90 - 130 - 50 = 90^\circ$.</p> |
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