Angle Relationships

Name: _____	Date: _____	Score: _____ / 24

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: $180° - 115° = 65°$. A good check: $115 + 65 = 180$, exactly a straight angle.

Answer: $65°$

PRACTICE

Find the missing angle measure.

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

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 $90°$, $130°$, and $50°$. What is the measure of the fourth sector? _____

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Answer Keys

1. $60°$
2. $45°$
3. $18°$
4. $75°$
5. $80°$
6. $135°$
7. $90°$
8. $45°$
9. $62°$
10. $118°$
11. $107°$
12. $90°$
13. $18°$
14. $30°$
15. $70°$
16. $20°$
17. $25°$
18. $30°$
19. $52°$
20. $90°$
21. $32°$
22. $56°$
23. $108°$
24. $90°$

Step-by-Step Explanations

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

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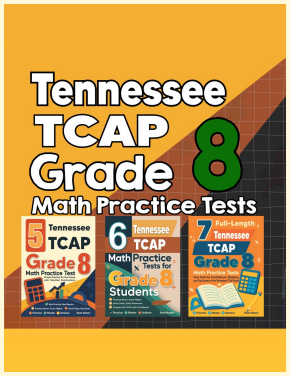

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