GRADE 7 ACCELERATED · UNIT 6 · THREAD B · DAY 1

# Angle Pairs: Supplementary, Complementary, Vertical, Adjacent

**MA.8.GR.1.4**

I can name an angle pair and use it to find a missing angle, with an equation when the angles are expressions.

# Warm-Up

1. A 6-ft man casts a 4-ft shadow; a tree, 18 ft. The tree's height?
2. How far apart are $(-4, 2)$ and $(5, 2)$?
3. Ana types 210 words in 5 minutes. Words per minute?
4. Two angles make a straight angle. One is 130°. The other?

# Warm-Up

1. A 6-ft man casts a 4-ft shadow; a tree, 18 ft. The tree's height?

   **27 ft**

2. How far apart are $(-4, 2)$ and $(5, 2)$? **9 units**

3. Ana types 210 words in 5 minutes. Words per minute? **42**

4. Two angles make a straight angle. One is 130°. The other?

   **50°**

# Vocabulary

**adjacent angles**

two angles with the same vertex and a shared side, that do not overlap

**vertical angles**

the angles across from each other where two lines cross; they are equal

**complementary angles**

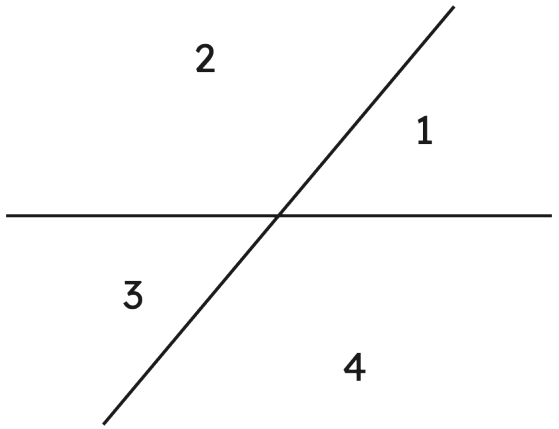
two angles that add to 90°

**supplementary angles**

two angles that add to 180°; a linear pair — two adjacent angles on a straight line — is supplementary

# Notes

## I. Adjacent and vertical

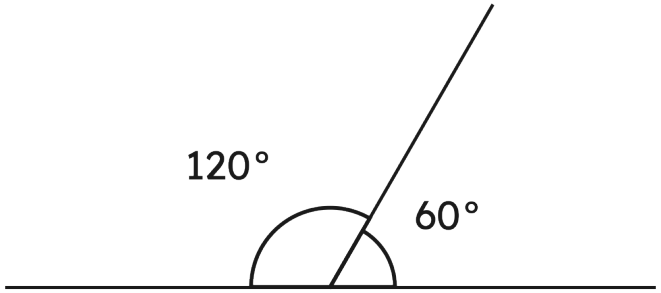



**Adjacent: one vertex, a shared side, no overlap — angles 1 and 2.**

**Vertical: across, and equal. m means measure:** $m\angle 1 = m\angle 3$.

# Notes

## II. Complementary and supplementary

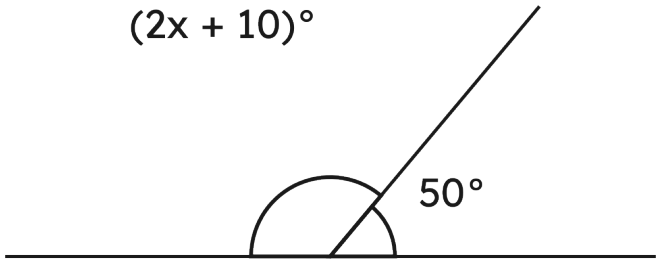



**Complementary: add to 90°.  Supplementary: add to 180°.**

A linear pair is supplementary: 60° + 120° = 180°.

# Notes

## III. Name the pair, write the equation, put x back

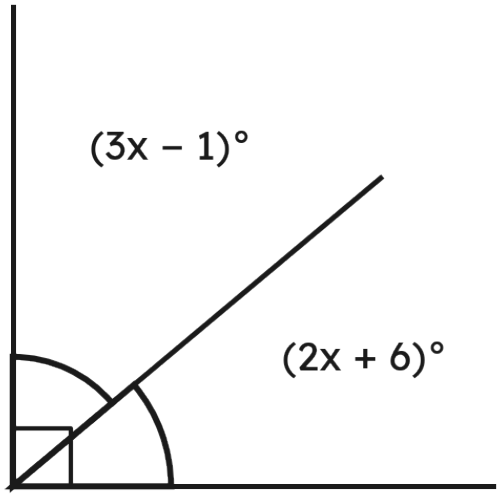



$$2x + 10 + 50 = 180, \quad 2x = 120, \quad x = 60$$

the angle: $2(60) + 10 = 130$

# Example 1

A ray splits a right angle into $(3x - 1)°$ and $(2x + 6)°$.




**Find x and both angles.**

# Example 1

$3x - 1 + 2x + 6 = 90$

$5x + 5 = 90, \quad x = 17$

$3(17) - 1 = 50, \quad 2(17) + 6 = 40$

**Answer: x = 17; the angles are 50° and 40°**

# Your Turn

$(4x)°$ and $(x + 10)°$ are complementary.

Find x and both angles.

# Your Turn

$(4x)°$ and $(x + 10)°$ are complementary.

Find x and both angles.

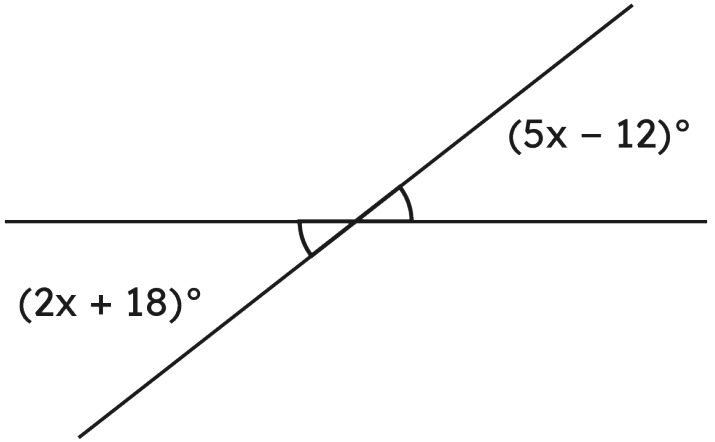
$$4x + x + 10 = 90, \quad 5x = 80, \quad x = 16$$

$$4(16) = 64, \quad 16 + 10 = 26$$

**Answer: x = 16; 64° and 26°**

# Example 2

Two lines cross. Vertical angles measure $(5x - 12)°$ and $(2x + 18)°$.




**Find the measure of each angle.**

# Example 2

$5x - 12 = 2x + 18$

$3x - 12 = 18$

$3x = 30, \quad x = 10$

$5(10) - 12 = 38$

**Answer: Each angle is 38°.**

# Your Turn

Vertical angles measure $(4x + 3)°$ and $(x + 39)°$.

Find the measure of each angle.

# Your Turn

Vertical angles measure $(4x + 3)°$ and $(x + 39)°$.

Find the measure of each angle.

equal: $4x + 3 = x + 39$

take x off both sides: $3x + 3 = 39$

$3x = 36$, $x = 12$

$4(12) + 3 = 51$

**Answer: Each angle is 51°.**

# Whiteboards · Question 1 of 9

**What is the complement of 34°?**

**Answer it.**

# Whiteboards · Question 1 of 9

**What is the complement of 34°?**

$$90 - 34 = 56$$

**Answer: 56°**

# Whiteboards · Question 2 of 9

**What is the supplement of 112°?**

**Answer it.**

# Whiteboards · Question 2 of 9

**What is the supplement of 112°?**

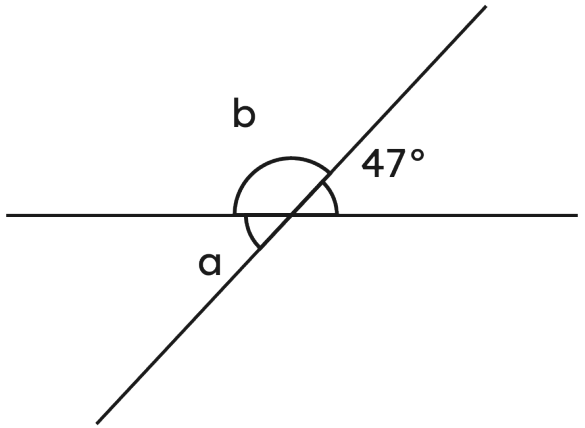
$$180 - 112 = 68$$

**Answer: 68°**

# Whiteboards · Question 3 of 9

Two lines cross. One angle is 47°.

**Find a and b.**

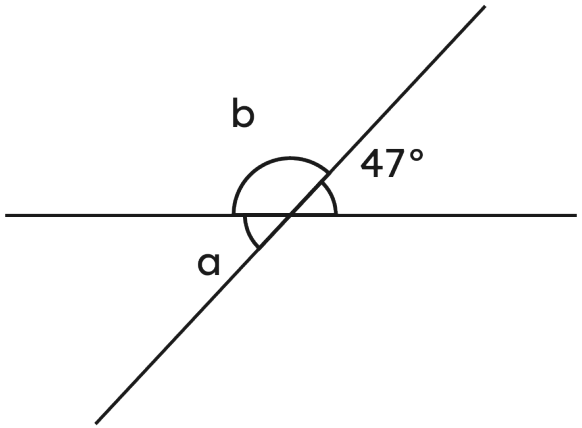



**Answer it.**

# Whiteboards · Question 3 of 9

Two lines cross. One angle is 47°.

**Find a and b.**




vertical: $a = 47$

a linear pair: $b = 180 - 47 = 133$

**Answer: $a = 47°$, $b = 133°$**

# Whiteboards · Question 4 of 9

**$\angle P$ and $\angle Q$ are complementary, and $m\angle P = 28°$.**

**What is $m\angle Q$?**

**A.** 152°

**B.** 62°

**C.** 28°

**D.** 118°

**Answer it.**

# Whiteboards · Question 4 of 9

**$\angle P$ and $\angle Q$ are complementary, and $m\angle P = 28°$.**

**What is $m\angle Q$?**

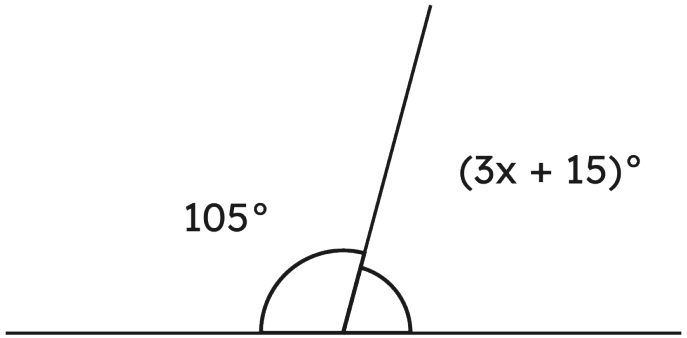
$$90 - 28 = 62$$

**Answer: B — 62°**

# Whiteboards · Question 5 of 9

A linear pair measures $(3x + 15)°$ and $105°$.

**Find x.**

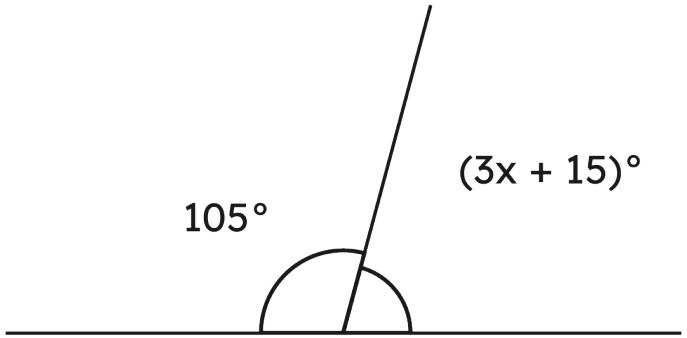



**Answer it.**

# Whiteboards · Question 5 of 9

A linear pair measures $(3x + 15)°$ and $105°$.

**Find x.**




$3x + 15 + 105 = 180$

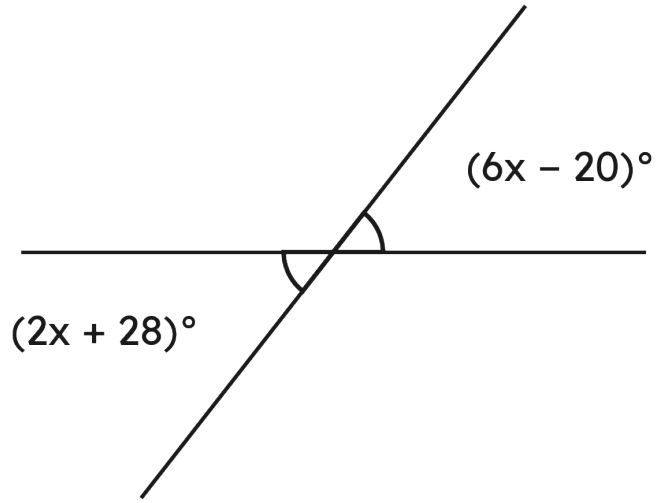
$3x = 60, \quad x = 20$

**Answer: $x = 20$**

# Whiteboards · Question 6 of 9

Vertical angles measure $(6x - 20)°$ and $(2x + 28)°$.

**Find the measure of each angle.**

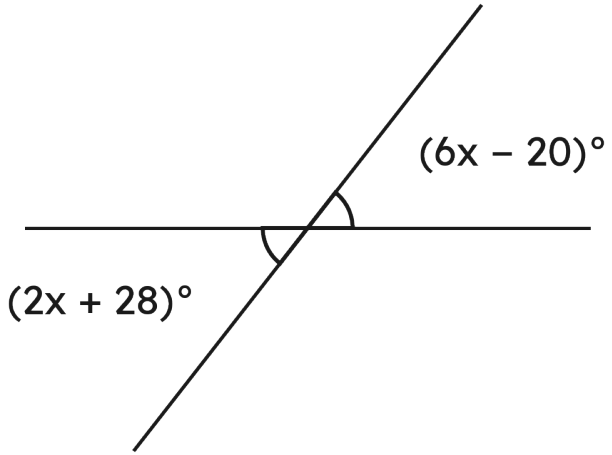



**Answer it.**

# Whiteboards · Question 6 of 9

Vertical angles measure $(6x - 20)°$ and $(2x + 28)°$.

**Find the measure of each angle.**




equal: $6x - 20 = 2x + 28$, so $4x - 20 = 28$

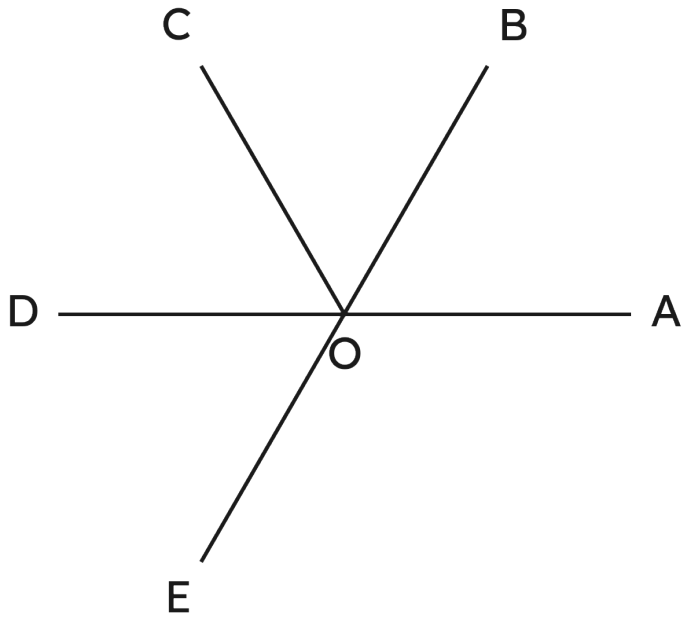
$4x = 48$, $x = 12$

$6(12) - 20 = 52$

**Answer: 52°**

# Whiteboards · Question 7 of 9

**Which two angles are adjacent?**




**A.** angles AOB and DOE

**B.** angles AOB and AOC

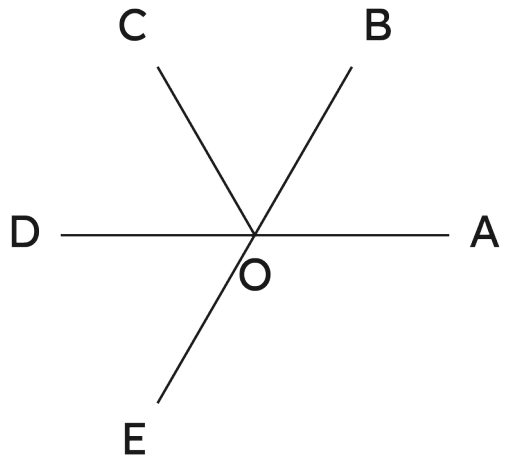
**C.** angles AOB and BOC

**D.** angles AOB and COD

**Answer it.**

# Whiteboards · Question 7 of 9

**Which two angles are adjacent?**



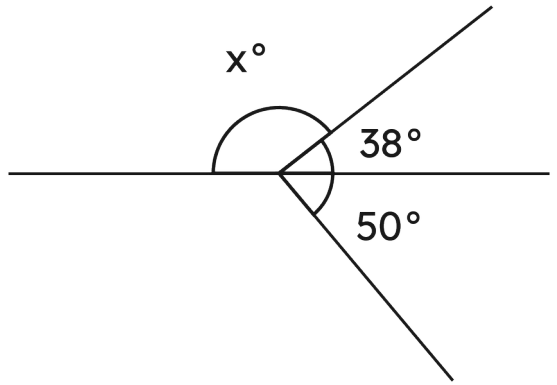

AOB and BOC share the side OB and do not overlap

**Answer: C — angles AOB and BOC**

# Whiteboards · Question 8 of 9

Above a straight line a ray makes angles of 38° and x°; below it another ray makes an angle of 50°.

**Find x.**

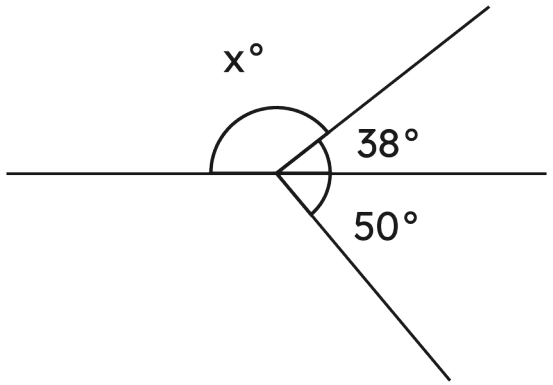



**Answer it.**

# Whiteboards · Question 8 of 9

Above a straight line a ray makes angles of 38° and x°; below it another ray makes an angle of 50°.

**Find x.**




$38 + x = 180$

$x = 142$

**Answer: x = 142**

# Whiteboards · Question 9 of 9

Can two vertical angles be complementary?

**Always, sometimes or never? Explain.**

**Write your answer in sentences.**

# Whiteboards · Question 9 of 9

Can two vertical angles be complementary?

**Always, sometimes or never? Explain.**

vertical: the two are equal

complementary: $90 \div 2 = 45$ each

**Answer: Sometimes — only when each is 45°.**

# Independent Set

1. What is the complement of $61°$?
2. What is the supplement of $76°$?
3. Two lines cross, and one of the four angles is $58°$. Find the other three.
4. A linear pair measures $(5x + 10)°$ and $70°$. Find $x$ and the first angle.
5. Vertical angles measure $(7x - 9)°$ and $(3x + 31)°$. Find the measure of each angle.
6. $\angle PQR$ and $\angle RQS$ share the side $QR$ and together make a straight line, and $m\angle PQR = 65°$. Name the pair and find $m\angle RQS$.

# IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 67. Due by the Unit 11 test.

**Today's skills — all required**

Identify complementary, supplementary, vertical, adjacent, and congruent angles — HGV

Find measures of complementary, supplementary, vertical, and adjacent angles — R2B

Write and solve equations using angle relationships — DBV