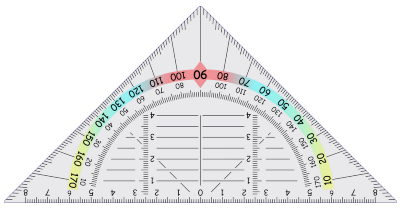
Name & Surname: _____ Class: _____ Date: _____

ANGLE EQUATIONS

Use angle facts to write and solve for x

About 45 minutes Level ★★★☆☆



FACTS YOU NEED

Two rays with a common vertex make an angle. Use **angle** facts to write an equation, then solve for x.

- **Complementary** angles add to 90°. For example, 90° − 32° = 58°.
- **Supplementary** angles add to 180°. For example, 180° − 115° = 65°.
- Vertical angles are opposite when two lines cross and are equal.
- Adjacent angles share a side. If they form a straight line, they add to 180°.
- Example: vertical angles 2x + 10 and 3x − 20 give 2x + 10 = 3x − 20, so x = 30.

TASK A /8

Work backwards through each machine to find missing inputs and outputs.

1 IN → × 2 → + 15 → OUT

In	Out
20	
35	
	115
	55

2 IN → × 3 → − 12 → OUT

In	Out
30	
44	
	90
	36

Created with LessonDino.com · AI lesson planner with checkable sources

COMPLEMENTS AND SUPPLEMENTS

Practice the basic facts before writing equations.

KEY WORDS

complementary: two angles that add to 90°

supplementary: two angles that add to 180°

vertical: opposite angles when two lines cross; they are equal

adjacent: angles that share a side and a vertex

equation: a number sentence with = that you solve for x

TASK B

/12

Find each missing angle or solve for x. Show your equation.

WARM UP

1 Find the **complement** of 32°.

Answer: _____

2 Find the **supplement** of 115°.

Answer: _____

3 Two **vertical** angles form when lines cross. One is 75°. Find the other.

Answer: _____

4 Two adjacent angles on a straight line. One is 48°. Find the other **angle**.

Answer: _____

PRACTICE

5 Angles (x + 10)° and 50° are **complementary**. Find x.

Answer: _____

6 Angles 2x° and 100° are **supplementary**. Find x.

Answer: _____

7 Vertical angles are 3x° and 75°. Find **x**.

Answer: _____

8 Angles 2x° and (x + 30)° make a **straight** line. Find x.

Answer: _____

PROBLEM SOLVING

9 A 90° corner is split into (2x + 5)° and (x + 10)°. Find **x**.

Answer: _____

10 Two adjacent angles on a straight edge are (2x + 20)° and (x + 40)°. Find **x**.

Answer: _____

11 Are 85° and 95° **supplementary**? Explain how you know.

Answer: _____

12 Vertical angles are (x + 15)° and 60°. Find **x**.

Answer: _____

Created with LessonDino.com · AI lesson planner with checkable sources

FIND THE MISTAKE

Spot the wrong step in each solution and fix it.

TASK C

/6

Find the wrong step, explain the mistake, and give the correct answer.



Student A

Angles 38° and x° are complementary. Find x.

1. x + 38 = 90
2. x = 90 + 38
3. x = 128°

The mistake is in step: _____

What went wrong?

.....

Correct answer: _____



Student B

Vertical angles are 2x° and 80°. Find x.

1. 2x + 80 = 180
2. 2x = 100
3. x = 50

The mistake is in step: _____

What went wrong?

.....

Correct answer: _____



Student C

Adjacent angles 2x° and (x + 30)° are on a straight line. Find x.

1. 2x + x + 30 = 180
2. 3x + 30 = 180
3. 3x = 210
4. x = 70

The mistake is in step: _____

What went wrong?

.....

Correct answer: _____

Created with LessonDino.com · AI lesson planner with checkable sources

ANGLE EQUATIONS

TASK D

/12

Use angle facts to write equations and solve for the missing angle.

WARM UP

1 Two angles are **complementary**. One measures 32°. What is the **other angle**?

Answer: _____

2 Two angles are **supplementary**. One measures 115°. What is the **other angle**?

Answer: _____

3 Two lines cross. One angle is 48°. What is its **opposite vertical angle**?

Answer: _____

4 Two **adjacent angles** share a side and form a **straight line**. One is 73°. What is the other?

Answer: _____

PRACTICE

5 Two **complementary angles** measure x° and x + 20°. Write the **equation** and solve for x.

Answer: _____

6 Two **adjacent angles** form a straight line and measure 3x + 10° and 2x + 25°. Write the **equation** and solve for x.

Answer: _____

7 Two **vertical angles** measure 2x + 10° and 3x - 20°. Write the **equation** and solve for x.

Answer: _____

8 Three **adjacent angles** on a straight line measure 2x°, 3x° and 50°. Write the **equation** and solve for x.

Answer: _____

PROBLEM SOLVING

9 A student folds the corner of a notebook so a 90° corner is split into 2x° and 3x + 10°. Use **complementary angles** to find the **value of x**.

Answer: _____

10 A lamp post stands straight on a flat sidewalk, making two **adjacent angles** with the sidewalk. The angles measure x + 40° and 3x - 20°. Find the **value of x**.

Answer: _____

11 Two crossing walking paths form **vertical angles**. Opposite angles measure 4x - 12° and 2x + 28°. What is the **angle measure**?

Answer: _____

12 A student says any two **adjacent angles** that share a side must add to 180°. Explain how you know if this is **correct**.

Answer: _____

Created with LessonDino.com · AI lesson planner with checkable sources

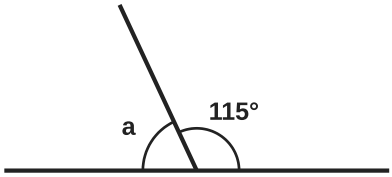
ANGLE EQUATIONS

TASK E

/4

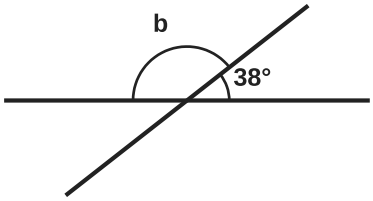
Find the missing angle in each diagram.

1



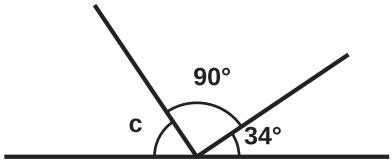
a = _____ °

2



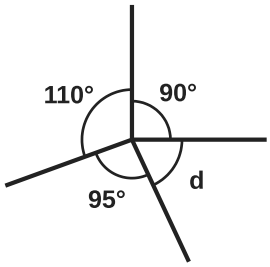
b = _____ °

3



c = _____ °

4



d = _____ °

The diagrams are drawn to size.

Created with LessonDino.com · AI lesson planner with checkable sources

ANGLE EQUATIONS

TASK F

/4

Decide if each is always, sometimes or never true.

Statement	Always	Sometimes	Never
Two **supplementary angles** add to **180°**.			
Convince me: _____			
Two **complementary angles** add to **180°**.			
Convince me: _____			
Vertical angles formed by two crossing lines are **equal**.			
Convince me: _____			
Two **adjacent angles** that share a side are **supplementary**.			
Convince me: _____			

HOW DID I DO?

Circle a face for each line.

I can identify complementary, supplementary, vertical, and adjacent angles. ☹ 😐 ☺

I can write a simple equation for an unknown angle. ☹ 😐 ☺

I can solve multi-step angle problems and check my work. ☹ 😐 ☺

Created with LessonDino.com · AI lesson planner with checkable sources

Answer sheet: Angle Equations

Task A

1. 20 → 55; 35 → 85; 50 → 115; 20 → 55
2. 30 → 78; 44 → 120; 34 → 90; 16 → 36

Task B

1. 58°
2. 65°
3. 75°
4. 132°
5. x = 30
6. x = 40
7. x = 25
8. x = 50
9. x = 25
10. x = 40
11. Yes, because 85 + 95 = 180.
12. x = 45

Task C

1. Step 2 is wrong: They added 38 instead of subtracting from 90. Complementary means add to 90°. Correct answer: 52°
2. Step 1 is wrong: They used supplementary instead of vertical. Vertical angles are equal, so 2x = 80. Correct answer: x = 40
3. Step 3 is wrong: They added 30 to 180 instead of subtracting. 180 − 30 = 150. Correct answer: x = 50

Task D

1. 58°
2. 65°
3. 48°
4. 107°
5. x = 35
6. x = 29
7. x = 30
8. x = 26
9. x = 16
10. x = 40
11. 68°
12. Not correct, only sometimes. Adjacent angles add to 180° only if they form a straight line, for example 73° + 107° = 180°, but 30° + 50° = 80° also share a side.

Task E

a = 65° (angles on a straight line add up to 180°)
b = 142° (angles on a straight line add up to 180°)
c = 56° (angles on a straight line add up to 180°)
d = 65° (angles around a point add up to 360°)

Task F

1. Always (Any two angles that add to 180° are supplementary, for example 115° + 65° = 180°.)
2. Never (Complementary angles always add to 90°, for example 32° + 58° = 90°.)
3. Always (Opposite angles are equal, for example if one angle is 48°, the opposite angle is also 48°.)
4. Sometimes (They are supplementary only if they form a straight line, for example 73° + 107° = 180°, but 30° + 50° = 80° share a side and are not supplementary.)

Pictures: Illustration: OpenClipart-Vectors · Pixabay; Characters: Open Peeps by Pablo Stanley (CC0)

Created with LessonDino.com · AI lesson planner with checkable sources