Unit 7, Lesson 4: Solving for Unknown Angles

Let's figure out some missing angles.

4.1: True or False: Length Relationships

Here are some line segments.

Decide if each of these equations is true or false. Be prepared to explain your reasoning.

$$CD + BC = BD$$

$$AB + BD = CD + AD$$

$$AC - AB = AB$$

$$BD - CD = AC - AB$$

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4.2: Info Gap: Angle Finding

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the *problem card*:

1. Silently read your card and think about what information you need to answer the question.

2. Ask your partner for the specific information that you need.

3. Explain to your partner how you are using the information to solve the problem.

4. Solve the problem and explain your reasoning to your partner.

If your teacher gives you the *data card*:

1. Silently read the information on your card.

2. Ask your partner "What specific information do you need?" and wait for your partner to *ask* for information. *Only* give information that is on your card. (Do not figure out anything for your partner!)

3. Before telling your partner the information, ask "Why do you need that information?"

4. After your partner solves the problem, ask them to explain their reasoning and listen to their explanation.

Pause here so your teacher can review your work. Ask your teacher for a new set of cards and repeat the activity, trading roles with your partner.
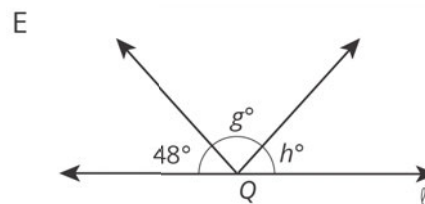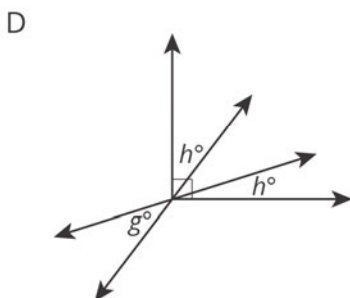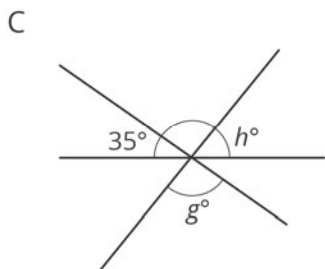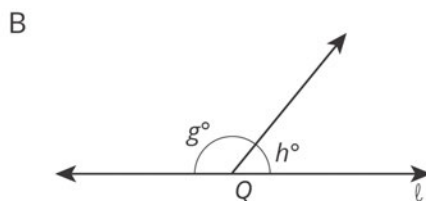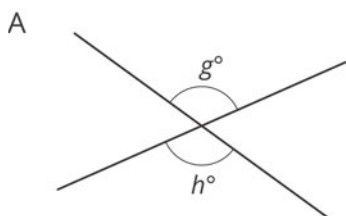
4.3: What's the Match?

Match each figure to an equation that represents what is seen in the figure. For each match, explain how you know they are a match.

A

B

C

D

E

1. $g + h = 180$

2. $g = h$

3. $2h + g = 90$

4. $g + h + 48 = 180$

5. $g + h + 35 = 180$

Are you ready for more?

1. What is the angle between the hour and minute hands of a clock at 3:00?

2. You might think that the angle between the hour and minute hands at 2:20 is 60 degrees, but it is not! The hour hand has moved beyond the 2. Calculate the angle between the clock hands at 2:20.

3. Find a time where the hour and minute hand are 40 degrees apart. (Assume that the time has a whole number of minutes.) Is there just one answer?

Lesson 4 Summary

We can write equations that represent relationships between angles.
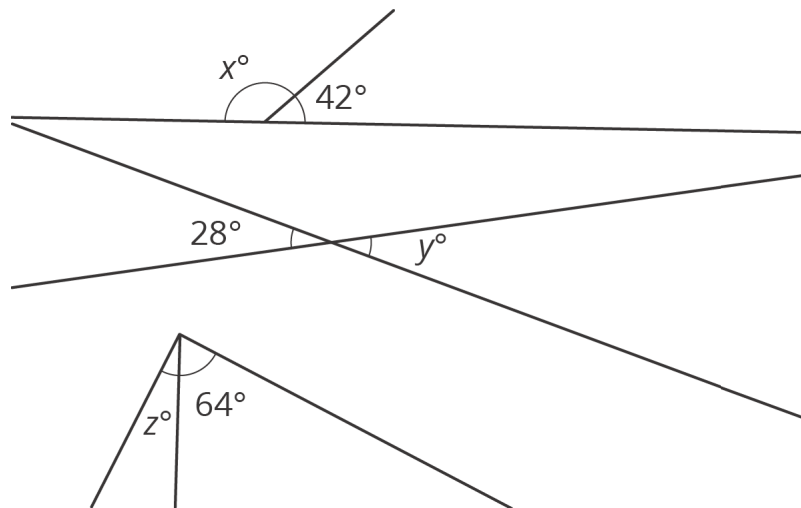
- The first pair of angles are supplementary, so $x + 42 = 180$.

- The second pair of angles are vertical angles, so $y = 28$.

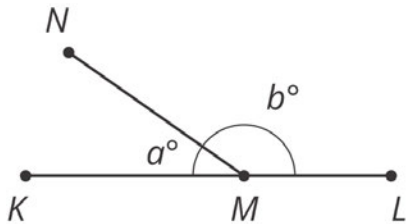- The third pair of angles are complementary, so $z + 64 = 90$.

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1. M is a point on line segment KL. NM is a line segment. Select **all** the equations that represent the relationship between the measures of the angles in the figure.
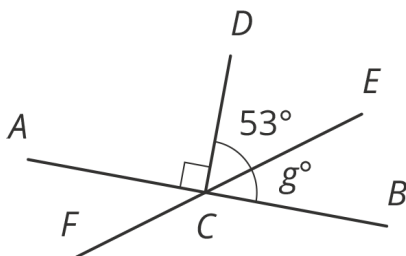

A. $a = b$

B. $a + b = 90$

C. $b = 90 - a$

D. $a + b = 180$

E. $180 - a = b$

F. $180 = b - a$

2. Which equation represents the relationship between the angles in the figure?
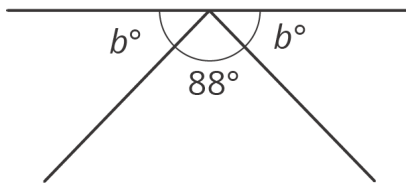
A. $88 + b = 90$

B. $88 + b = 180$

C. $2b + 88 = 90$

D. $2b + 88 = 180$

3. Segments AB, EF, and CD intersect at point C, and angle ACD is a right angle. Find the value of g.

4. Select **all** the expressions that are the result of decreasing x by 80%.

A. $\frac{20}{100}x$

B. $x - \frac{80}{100}x$

C. $\frac{100-20}{100}x$

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D. $0.80x$

E. $(1 - 0.8)x$

(from Unit 6, Lesson 12)

5. Andre is solving the equation $4(x + \frac{3}{2}) = 7$. He says, "I can subtract $\frac{3}{2}$ from each side to get $4x = \frac{11}{2}$ and then divide by 4 to get $x = \frac{11}{8}$." Kiran says, "I think you made a mistake."

   a. How can Kiran know for sure that Andre's solution is incorrect?

   b. Describe Andre's error and explain how to correct his work.

   (from Unit 6, Lesson 8)

6. Solve each equation.

   a. $\frac{1}{7}x + \frac{3}{4} = \frac{9}{8}$

   b. $\frac{2}{3} + \frac{1}{5}x = \frac{5}{6}$

   c. $\frac{3}{2} = \frac{4}{3}x + \frac{2}{3}$

   d. $0.3x + 7.9 = 9.1$

   e. $11.03 = 8.78 + 0.02x$

   (from Unit 6, Lesson 7)

7. A train travels at a constant speed for a long distance. Write the two constants of proportionality for the relationship between distance traveled and elapsed time. Explain what each of them means.

time elapsed (hr)	distance (mi)
1.2	54
3	135
4	180

(from Unit 2, Lesson 5)