Part A: Answer the following question in the space provided.

1. Classify the following triangles by i) sides  
   ii) angles

   a) ![Triangle A](image1)

   i) sides: ____________________  
   ii) angles: ____________________

   b) ![Triangle B](image2)

   i) sides: ____________________  
   ii) angles: ____________________

2. Determine the values of the variables.

   a) ![Diagram A](image3)

   a = ______  
   b = ______

   b) ![Diagram B](image4)

   c = ______  
   d = ______  
   e = ______

   c) ![Diagram C](image5)

   f = ______  
   g = ______

   d) ![Diagram D](image6)

   h = ______

   e) ![Diagram E](image7)

   f) ![Diagram F](image8)

   j = ______

3. Match the phrase in **A** with the correct definition in **B** by putting the correct letter in the blank.

   **A**
   (a) Two angles that add to 180°  
   (b) A reflex angle  
   (c) A right angle  
   (d) A straight angle  
   (e) Two angles that add to 90°

   **B**
   ______ A 90° angle  
   ______ Complementary Angles  
   ______ A 180° angle  
   ______ An angle greater than 180° but less than 360°  
   ______ Supplementary Angles
4. Why are the following triangles similar?

5. Why are the following triangles similar?

Part B: Answer the following question in the space provided. Show full solutions like the ones done in class.

1. In a survey, 8 out of 45 people ate fruit at lunch.
   In a school with 1320 students about how many ate fruit at lunch? Answer to the nearest student.

2. During a chemical reaction potassium and oxygen combine in the ratio 2 to 13 by mass.
   How much oxygen must combine with 5.7 grams of potassium during the reaction? Answer to 1 decimal place.
3. Determine the value of \( x \) decimal place if necessary. Show your work.

[Diagram of two triangles with sides labeled 13, 20, and \( x \) in one, and 5, 11, and \( x \) in the other.]

4. Sam is building a patio fence using sections with dimensions as shown. A cross-brace is required. Determine the length of the cross-brace to 2 decimal places.

[Diagram of a cross-brace with dimensions 2.44 m and 1.83 m.]

Part C: Answer the following questions in the space provided using similar triangles. Be sure to mark equal angles. You must have full solutions, like the ones done in class.

1. Determine the values of the variables \( x \) and \( y \) to 1 decimal place.

[Diagram of two triangles with sides labeled 20.5, 12, and \( y \) in one, and 11, 8, and \( x \) in the other.]
2. Determine the value of $x$ to 1 decimal place.

3. To find the distance $x$ across a pond, surveyors measured the distances shown. Use these distances to calculate the distance across the pond.

4. Determine the distance, $x$, across the river to one decimal place.
Part A: Answer the following question in the space provided.

1. Classify the following triangles by i) sides ii) angles
   a)  
   i) sides: Isosceles  
   ii) angles: Acute
   b)  
   i) sides: Scalene  
   ii) angles: Right

2. Determine the values of the variables.
   a)  
   \[ a = 155^\circ \]
   \[ b = 25^\circ \]

   b)  
   \[ c = 61^\circ \]

   c)  
   \[ d = 85^\circ \]
   \[ e = 95^\circ \]

   d)  
   \[ f = 110^\circ \]
   \[ 70^\circ + 40^\circ \]

   e)  
   \[ g = 60^\circ \]
   \[ h = 60^\circ \] (equilateral)

   f)  
   \[ j = 72^\circ \]

3. Match the phrase in A with the correct definition in B by putting the correct letter in the blank.

   A
   (a) Two angles that add to 180°
   (b) A reflex angle  
   (c) A right angle  
   (d) A straight angle  
   (e) Two angles that add to 90°

   B
   (c) A 90° angle
   (e) Complementary Angles
   (d) A 180° angle
   (b) An angle greater than 180° but less than 360°
   (a) Supplementary Angles
4. Why are the following triangles similar? 

**Because the corresponding angles are equal**

5. Why are the following triangles similar?

**Because the ratio of the corresponding sides are equal**

Part B: Answer the following question in the space provided. Show full solutions like the ones done in class.

1. In a survey, 8 out of 45 people ate fruit at lunch.
   In a school with 1320 students about how many ate fruit at lunch? Answer to the nearest student.
   
   \[
   \frac{8}{45} = \frac{x}{1320}
   \]
   
   \[
   \begin{align*}
   1320 \times \frac{8}{45} &= x \\
   235 &= x
   \end{align*}
   \]
   
   
   \[
   \text{235 students ate fruit for lunch.}
   \]

2. During a chemical reaction potassium and oxygen combine in the ratio 2 to 13 by mass.
   How much oxygen must combine with 5.7 grams of potassium during the reaction? Answer to 1 decimal place.
   
   \[
   \frac{2}{13} = \frac{5.7}{x}
   \]
   
   \[
   \begin{align*}
   \left( \frac{5.7}{2} \right) \frac{13}{2} &= \frac{x}{5.7} \\
   37.1 &= x
   \end{align*}
   \]
   
   \[
   \text{Oxygen combines with 37.1 grams of potassium.}
   \]
3. Determine the value of \( x \) decimal place if necessary. Show your work.

   a) \[
   h^2 = a^2 + b^2 \\
   20^2 = x^2 + 13^2 \\
   400 = x^2 + 169 - 169 \\
   \sqrt{231} = x^2 \\
   15.2 = x
   \]

   b) \[
   h^2 = a^2 + b^2 \\
   11^2 = x^2 + 5^2 \\
   121 = x^2 + 25 \\
   x^2 = 96 \\
   x = 12.1 \sqrt{6}
   \]

4. Sam is building a patio fence using sections with dimensions as shown. A cross-brace is required. Determine the length of the cross-brace to 2 decimal places.

   \[
   h^2 = a^2 + b^2 \\
   x^2 = 1.83^2 + 2.44^2 \\
   x^2 = 9.3025 \\
   x = 3.05
   \]

   \[\boxed{\text{The cross-brace is } 3.05 \text{ m long.}}\]

**Part C:** Answer the following questions in the space provided using similar triangles. Be sure to mark equal angles. You must have full solutions, like the ones done in class.

1. Determine the values of the variables \( x \) and \( y \) to 1 decimal place.

   a) \[
   12:8 = y : 11 \\
   \frac{12}{8} = \frac{y}{11} (11) \\
   16.5 = y
   \]

   b) \[
   12:8 = 20.5 : x \\
   \frac{12}{8} = \frac{20.5}{x} \\
   \frac{8}{12} = \frac{x}{20.5} (20.5) \\
   13.7 = x
   \]
2. Determine the value of $x$ to 1 decimal place.

\[
\frac{75}{80} = \frac{x + 80}{x} \\
\frac{75x}{80} = x + 80 \\
75x - 80x = 640 \\
-5x = 640 \\
5x = -640 \\
40x = 2800 \\
\frac{40x}{40} = \frac{2800}{40} \\
x = 70
\]

3. To find the distance $x$ across a pond, surveyors measured the distances shown. Use these distances to calculate the distance across the pond.

\[
\frac{39.3}{14.2} = \frac{x}{14.2} \\
39.3 = 22.5 \times x \\
\frac{39.3}{22.5} = \frac{x}{22.5} \\
24.8 = x
\]

The distance across the pond is 24.8 m.

4. Determine the distance, $x$, across the river to one decimal place.

\[
\frac{75}{25} = \frac{30}{x} \\
75x = 750 \\
5x = 30 \\
\frac{25}{75} = \frac{x}{30} \\
10 = x
\]

The distance across the river is 10 m.