Notes – Applying the Pythagorean Theorem

I. Sometimes, you may need to _______ the Pythagorean Theorem to solve problems involving _____________ figures, _______ -world distances, or other situations. _____________ a diagram may help you realize that the _____________ ____________ could be the key to solving a particular problem.

1) A rectangular swimming pool has a length of 24 ft. and a width of 18 ft. A hose needs to extend from the southwest corner of the pool to the northeast corner of the pool. How long does the hose need to be?

2) A team of archaeologists fenced off an ancient ruin they are exploring. They created a grid to represent the area, so they could label the locations of several artifacts.

For example, they found a pot at point P and a pitcher at point R. If each unit on the grid represents 2 meters, approximately how many meters apart were the pitcher and the _____________.

3) The San Francisco Giants 1st baseman throws the baseball to the 2nd baseman to record an out. To the nearest tenth of a foot, what was the distance that the ball was thrown?
4) Kevin is drawing a right triangle with legs of 12 cm and 16 cm. If he draws a square on the hypotenuse, using the entire hypotenuse as one side of the square, what will be the area of that square?

5) The legs of a right triangle are 9 ft and 40 ft. Jake is computing the length of the hypotenuse. He found the sum of $9^2$ and $40^2$. What should he do next?
   
a) subtract $9^2$ from $40^2$  
c) Take the square root of the sum  
b) Square the sum of $9^2$ and $40^2$  
d) Nothing.

6) Michael's flat screen is 24 inches in length and 7 inches in width. The size of the flat screen equals the length of a tape measure that is placed diagonally across the flat screen. What is the size of Michael's flat screen?

7) The gate of a rectangular fence is 8 ft tall and 15 ft wide. How long is the diagonal strip used to brace this gate?

8) David is drawing a right triangle with legs 3 cm and 4 cm. If he draws a square whose sides are each the length of the hypotenuse, what will be the area of that square?

9) A 13-foot ladder is placed against a brick wall. The base of the ladder is 3 feet from the base of the wall. How far up the wall is the top of the ladder to the nearest tenth of a foot?

10) Rosa has let out 75 feet of string on her kite. Kyra is standing 45 feet away from Rosa and is directly under the kite. How high, in feet, is the kite, if Rosa is holding the string 3 feet from the ground?

11) The size of a tv set is measured by the length of the diagonal. Robert has a 35-inch tv. The height of the screen is 21 inches. What is its width?
Notes – Applying the Pythagorean Theorem

1. Sometimes, you may need to **apply** the Pythagorean Theorem to solve problems involving geometric figures, real-world distances, or other situations. **Drawing** a diagram may help you realize that the Pythagorean Theorem could be the key to solving a particular problem.

1) A rectangular swimming pool has a length of 24 ft. and a width of 18 ft. A hose needs to extend from the southwest corner of the pool to the northeast corner of the pool. How long does the hose need to be?

\[ a^2 + b^2 = c^2 \]

\[ 24^2 + 18^2 = c^2 \]

\[ 576 + 324 = c^2 \]

\[ 900 = c^2 \]

\[ c = \sqrt{900} = 30 \text{ ft.} \]

1) **Draw a pic. and label**

2) **Use Pythagorean Thm.**

**Substitute & solve.**

2) A team of archaeologists fenced off an ancient ruin they are exploring. They created a grid to represent the area, so they could label the locations of several artifacts.

Since each grid represents 2 meters, we multiply the # of boxes by 2.

**Archaeologist’s Finds**

\[ a^2 + b^2 = c^2 \]

\[ 12^2 + 4^2 = c^2 \]

\[ 144 + 16 = c^2 \]

\[ 160 = c^2 \]

\[ c = \sqrt{160} = 12.6 \text{ ft.} \]

For example, they found a pot at point \( P \) and a pitcher at point \( R \). If each unit on the grid represents 2 meters, approximately how many meters apart were the pitcher and the pot found?

3) The San Francisco Giants 1st baseman throws the baseball to the 2nd baseman to record an out. To the nearest tenth of a foot, what was the distance that the ball was thrown?

\[ a^2 + b^2 = c^2 \]

\[ 5^2 + 6^2 = c^2 \]

\[ 25 + 36 = c^2 \]

\[ 61 = c^2 \]

\[ c = \sqrt{61} = 7.8 \text{ ft.} \]
4) Kevin is drawing a right triangle with legs of 12 cm and 16 cm. If he draws a square on the hypotenuse, using the entire hypotenuse as one side of the square, what will be the area of that square?

\[ a^2 + b^2 = c^2 \]
\[ 12^2 + 16^2 = c^2 \]
\[ 144 + 256 = c^2 \]
\[ 400 = c^2 \]
\[ 20 = c \]
Find \( A = c^2 \) \[ 20 \times 20 = 400 \text{ cm}^2 \] STOP!

5) The legs of a right triangle are 9 ft and 40 ft. Jake is computing the length of the hypotenuse. He found the sum of \( 9^2 \) and \( 40^2 \). What should he do next?

a) subtract \( 9^2 \) from \( 40^2 \)
b) Square the sum of \( 9^2 \) and \( 40^2 \)
c) Take the square root of the sum
d) Nothing.

6) Michael's flat screen is 24 inches in length and 7 inches in width. The size of the flat screen equals the length of a tape measure that is placed diagonally across the flat screen. What is the size of Michael's flat screen?

\[ a^2 + b^2 = c^2 \]
\[ 24^2 + 7^2 = c^2 \]
\[ 576 + 49 = c^2 \]
\[ 625 = c^2 \]
\[ 25 = c \]
Find diagonal \( = c \) \[ 25 \text{ in} \]

7) The gate of a rectangular fence is 8 ft tall and 15 ft wide. How long is the diagonal strip used to brace this gate?

\[ a^2 + b^2 = c^2 \]
\[ 8^2 + 15^2 = c^2 \]
\[ 64 + 225 = c^2 \]
\[ 289 = c^2 \]
\[ 17 = c \]

8) David is drawing a right triangle with legs 3 cm and 4 cm. If he draws a square whose sides are each the length of the hypotenuse, what will be the area of that square?

\[ a^2 + b^2 = c^2 \]
\[ 3^2 + 4^2 = c^2 \]
\[ 9 + 16 = c^2 \]
\[ 25 = c^2 \]
\[ 5 = c \]
\[ 25 = c^2 \] STOP!

9) A 13-foot ladder is placed against a brick wall. The base of the ladder is 3 feet from the base of the wall. How far up the wall is the top of the ladder to the nearest tenth of a foot?

\[ a^2 + b^2 = c^2 \]
\[ 3^2 + b^2 = 13^2 \]
\[ 9 + b^2 = 169 \]
\[ b^2 = 160 \]
\[ b = 12.6 \text{ ft} \]

10) Rosa has let out 75 feet of string on her kite. Kyra is standing 45 feet away from Rosa and is directly under the kite. How high, in feet, is the kite, if Rosa is holding the string 3 feet from the ground?

\[ a^2 + b^2 = c^2 \]
\[ 42^2 + b^2 = 75^2 \]
\[ 1764 + b^2 = 5625 \]
\[ b^2 = 3861 \]
\[ b = 62.5 \text{ ft} \]

11) The size of a TV set is measured by the length of the diagonal. Robert has a 35-inch TV. The height of the screen is 21 inches. What is its width?

\[ a^2 + b^2 = c^2 \]
\[ 21^2 + b^2 = 35^2 \]
\[ 441 + b^2 = 1225 \]
\[ b^2 = 784 \]
\[ b = 28 \text{ in.} \]
\[ 28 \times 12 = \text{diagonal} \]

\[ a = 21 \text{ in.} \]