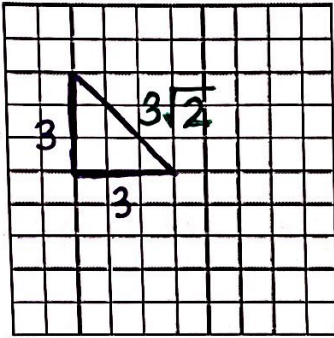


Day 3 - Discovering 45-45-90 Triangles – Notes

Activity: Discovering the 45-45-90 Triangle Relationship

1. Create three different isosceles right triangles on the graphs below.
2. Use the Pythagorean Theorem to find the missing side length.
3. Simplify the answer so that it remains in radical form.

Triangle 1



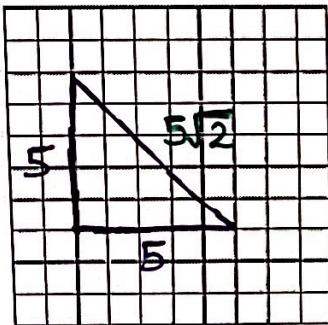
$$3^2 + 3^2 = c^2$$

$$9 + 9 = c^2$$

$$\sqrt{18} = \sqrt{c^2}$$

$$3\sqrt{2} = c$$

Triangle 2



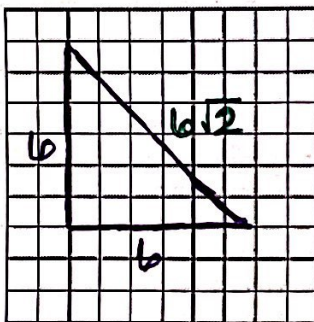
$$5^2 + 5^2 = c^2$$

$$25 + 25 = c^2$$

$$\sqrt{50} = \sqrt{c^2}$$

$$5\sqrt{2} = c$$

Triangle 3



$$6^2 + 6^2 = c^2$$

$$36 + 36 = c^2$$

$$\sqrt{72} = \sqrt{c^2}$$

$$6\sqrt{2} = c$$

What did you notice about the side lengths in each triangle?

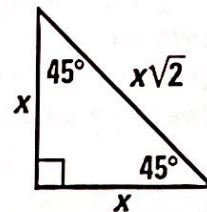
- Side lengths are the same
- The hypotenuse is the side length $\sqrt{2}$ ($\times\sqrt{2}$)

45-45-90 Triangle Relationship

45°-45°-90° Triangle Theorem

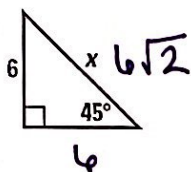
Words In a 45°-45°-90° triangle, the length of the hypotenuse is the length of a leg times $\sqrt{2}$.

Symbols hypotenuse = leg $\cdot \sqrt{2}$

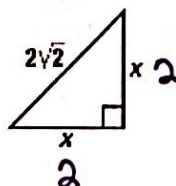


Practice: Solve for x.

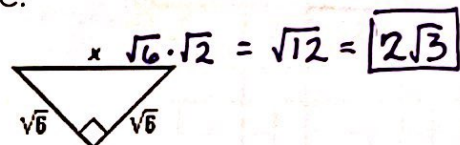
A.



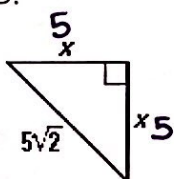
B.



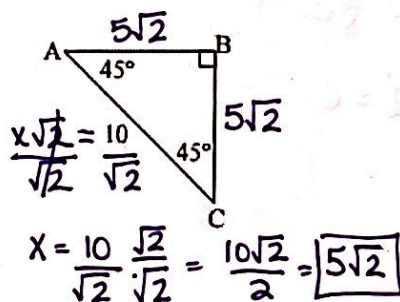
C.



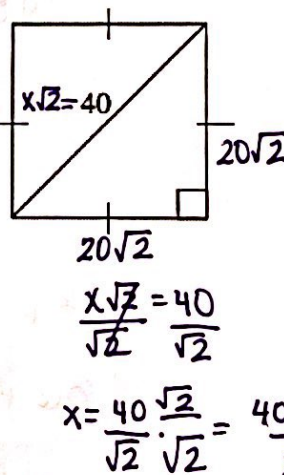
D.



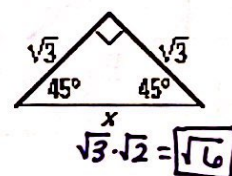
E.



F.

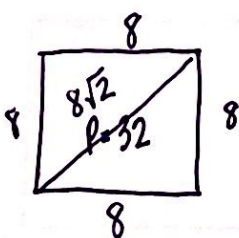


G.



Application of 45-45-90 Triangles

H. A square has a perimeter of 32 inches. How long is each leg and its diagonal? What is the area of the square?



leg: 8
diagonal: $8\sqrt{2}$