Square Roots on the ISEE

Middle and Upper Level

LESSON GOAL: Be able to quickly find the square root of a perfect square on the ISEE.

ISEE Question: A square photograph that measures 144 inches^2 is placed in a perfectly fitting wooden frame. What is the perimeter of the frame?

A) 12 inches
B) 24 inches
C) 48 inches
D) 96 inches

Solution: There's no diagram with this problem, but the words "square" and "perimeter" tell us it's geometry.

STEP 1: Analyze what's given. There's only one number in the problem, and it is in square inches, so it must represent the ***area*** of the square. A rectangle's area equals the length*width ($A = l \times w$), but in a square the length and width are the same, so the area is side squared: $A = s^2$.

STEP 2: If the area of the photograph is 144 inches^2, then its side must be $\sqrt{144} = 12$ inches.

Helpful Tip: It really saves time to memorize the ***perfect squares*** up to 12 before you take the ISEE:

$1 = 1^2$, so $\sqrt{1} = 1$
$4 = 2^2$, so $\sqrt{4} = 2$
$9 = 3^2$, so $\sqrt{9} = 3$
$16 = 4^2$, so $\sqrt{16} = 4$
$25 = 5^2$, so $\sqrt{25} = 5$
$36 = 6^2$, so $\sqrt{36} = 6$
$49 = 7^2$, so $\sqrt{49} = 7$
$64 = 8^2$, so $\sqrt{64} = 8$
$81 = 9^2$, so $\sqrt{81} = 9$
$100 = 10^2$, so $\sqrt{100} = 10$
$121 = 11^2$, so $\sqrt{121} = 11$
$144 = 12^2$, so $\sqrt{144} = 12$

STEP 3: We're not done! The test-makers are hoping we will pick A) as soon as we find the side of the square is 12 inches, but we know to expect traps like that. The question asks for the ***perimeter*** of the photograph, which is 4 x 12 = 48 inches, or answer choice C).

For a lesson on how to estimate the square root of a non-perfect square, see Square Root Estimates.