Square Root Estimates on the ISEE

Middle and Upper Level

LESSON GOAL: Be able to quickly estimate the square root of ANY number on the ISEE.

ISEE Question: Which of the following is closest to $\sqrt{118}$?

A) 10
B) 11
C) 18
D) 100

Solution: *YES*, we *CAN* do this problem without a calculator! And it's pretty easy and quick! All we need to figure out which perfect square the number is closest to.

Perfect squares are the squares of whole numbers. Here are the first 12:

$1 = 1^2$, 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 $\sqrt{144} = 12$

Helpful Tip: Memorizing the perfect squares up to 144 before the ISEE will save you precious time on the exam. They appear in all sorts of arithmetic, algebra and even geometry problems (areas of figures, Pythagorean Theorem, etc …).

STEP 1: Find the closest perfect square close to 118. It is 121, and if $\sqrt{121} = 11$, $\sqrt{118}$ would equal slightly less than 11 (10.86 to be precise, but there's no way to know that without a calculator). The answer is B).

Helpful Tip: Just like exponents increase numbers a great deal, square roots decrease them by a lot. Even without solving this problem, you should be able to eliminate answer choice D).