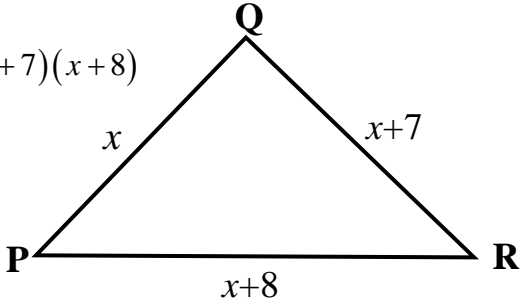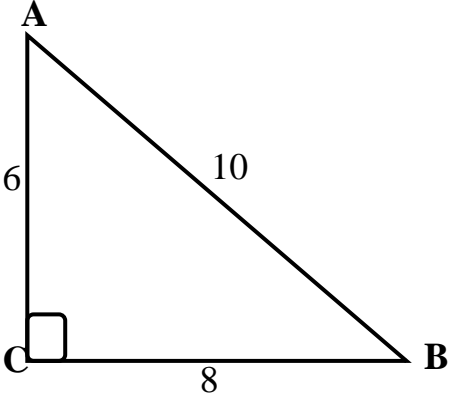**NORTH CAROLINA EARLY MATH
PLACEMENT TESTING PROGRAM**

Providing a Timely Reality Check of Readiness for College-Level Mathematics

NC EMPT 2019-2020 Test Version (Due to Covid, this version was used used from 2019-2021)
4,146 high school student participants

TOP TEN MISSED QUESTIONS

These questions are typical of those found on actual college math placement exams throughout the UNC System, NC community colleges, and other private colleges and universities. The questions are formatted for use as a quick review or warm-up exercise for high school students in Algebra II, NC Math 3, NC Math 4, Discrete Math for Computer Science, Precalculus, Statistics, and other upper-level math courses. A PDF of this document and more can be found at NCEMPT.ORG.

Top Ten Missed	Students Answering **IN**CORRECTLY	Test Item, 2019-2020 NC EMPT Test Version
1. (#10 in 2019-20 test booklet)	78%	Given right triangle PQR with right angle $Q,$ what is the area of triangle PQR? A. $3x+15$ B. $x^2 +(x+7)^2 =(x+8)^2$ C. $\frac{1}{2}x(x+8)$ D. $\frac{1}{2}x(x+7)(x+8)$ E. $\frac{1}{2}x(x+7)$
2. (#22 in **2019-20 test booklet**)	**74%**	The equation $x-\dfrac{3}{x}=\dfrac{1}{2}$ has two solutions. Find the <u>sum</u> of the two solutions. A. $-\dfrac{5}{2}$ B. -2 C. $-\dfrac{1}{2}$ D. $\dfrac{1}{2}$ E. $1\dfrac{1}{2}$

Top Ten Missed	Students Answering **IN**CORRECTLY	Test Item, 2019-2020 NC EMPT Test Version
3. (#27 in 2019-20 test booklet)	73%	The solution to the quadratic inequality $x^2 - 14x \le 15$ is equivalent to which interval notation below? A. $[-1,\ 15]$ B. $[-3,\ 5]$ C. $[3,\ 5]$ D. $(-\infty,\ -1] \cup [15,\ \infty)$ E. $(-\infty,\ 3] \cup [5,\ \infty)$
4. (#9 in 2019-20 test booklet)	72%	The price of propane this year is \$4.10 per gallon. If that represents a 30% increase over last year's price, what was the price of a gallon of propane last year? A. \$1.23 B. \$2.87 C. \$3.15 D. \$3.33 E. \$5.33
5. (#31 in 2019-20 test booklet)	69%	Refer to the given right triangle ABC. Find the value of this expression: $5\sin A + 10\cos B - 8\tan B$ A. 3 B. 4 C. 6 D. 7 E. 9
6. (#30 in **2019-20 test booklet)**	**68%**	Multiply these complex numbers and write the answer in $a + bi$ form: $(-3 + 2i)(-3 - 7i)$ A. $-5 + 27i$ B. $-5 + 15i$ C. $-5 - 27i$ D. $23 - 15i$ E. $23 + 15i$

Top Ten Missed	Students Answering **IN**CORRECTLY	Test Item, 2019-2020 NC EMPT Test Version
7. (#24 in 2019-20 test booklet)	67%	Solve for x: $49x^4 = 25x^2$ A. $\pm\dfrac{25}{49}$ B. $\pm\dfrac{7}{5},\ 0$ C. $\pm\dfrac{49}{25}$ D. $\pm\dfrac{5}{7},\ 0$ E. $\pm\dfrac{5}{7}$
8. (#18 in 2019-20 test booklet)	66%	When the polynomial $4x^4 - 13x^2 - 2x + 1$ is divided by $x - 2$, what is the remainder? A. -23 B. 1 C. 3 D. 9 E. 17
9. (#29 in 2019-20 test booklet)	65%	Which quadratic function below has a graph with a vertex at $(-3,\ 2)$? A. $f(x) = x^2 + 6x + 11$ B. $f(x) = x^2 - 6x + 11$ C. $f(x) = -x^2 - 6x - 8$ D. $f(x) = -x^2 + 6x - 8$ E. $f(x) = x^2 + 6x + 6$
10. (#32 in 2019-20 test booklet)	64%	Given this system of two equations: $\begin{cases} x + 2y = 5 \\ 4x - 6y = 9 \end{cases}$ Find x. A. 0 B. $\dfrac{11}{14}$ C. 2 D. $\dfrac{24}{7}$ E. 5

The average score for the 4,146 high school participants on the 2019-2020 NC EMPT test version administered in 2021-2022was 15.4 out of 32 questions, or 48%.

Correct Answers to the Top Ten Missed Questions, 2019-2020
1. E   2. D   3. A   4. C   5. C   6. E   7. D   8. D   9. A   10. D