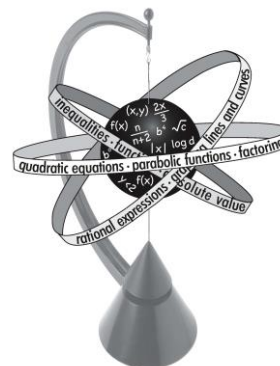


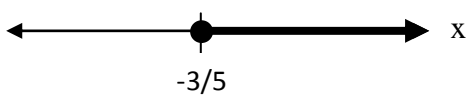
# North Carolina Early Mathematics Placement Testing Program

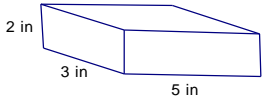
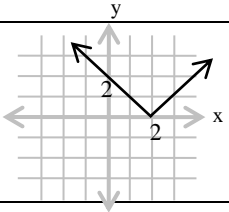
July 2016  
Volume 3

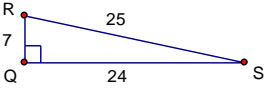
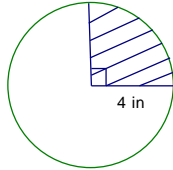
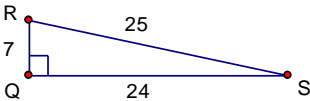
# TOP 30 MISSED Questions PUZZLE



These mathematics questions were most often answered incorrectly by high school students across North Carolina on NC EMPT practice placement test versions (2012-2013, 2013-2014, and 2014-2015). The questions are typical of those found on actual college math placement exams throughout UNC institutions and NC community colleges so it is important to practice and avoid the same errors. Pages 1-3 list the 30 questions. The last page contains the scrambled answers. Show all work for each problem on notebook paper and then write the correct answer from the last sheet next to the appropriate problem on pages 1-3.

	Question	Answer
1.	If the price of a jacket is reduced by 10%, the sale price is \$113.40. What was the original price in dollars?	
2.	Simplify: $(2 + \sqrt{7})^2$	
3.	The absolute value equation $ x - 2  = 3$ has two solutions. What is the <u>sum</u> of these solutions?	
4.	Find an equation of a line that contains the point (1,1) and is perpendicular to the line $y = 3x + 5$ .	
5.	Simplify: $\frac{6a^4 + 2a}{2a}$ (where $a \neq 0$ )	
6.	If one leg of a right triangle has length $x$ and the hypotenuse has length $z$ , then what is the length of the other leg?	
7.	<p>Given: </p> <p>This is an illustration of the solution set for which inequality below?</p> <p>A. <math>5x &gt; -3</math>    B. <math>-5x \leq 3</math>    C. <math>5x \leq -3</math>    D. <math>-5x \geq -3</math>    E. <math>-5x &gt; 3</math></p>	

8.	<p>In the given table, the number of tigers at Zoo A is shown for various years. What is the percentage increase from 1990 to 2000?</p> <p style="text-align: center;">Tiger Population at Zoo A</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>1970</th> <th>1980</th> <th>1990</th> <th>2000</th> </tr> </thead> <tbody> <tr> <td>Number of Tigers</td> <td>0</td> <td>8</td> <td>4</td> <td>12</td> </tr> </tbody> </table>	Year	1970	1980	1990	2000	Number of Tigers	0	8	4	12							
Year	1970	1980	1990	2000														
Number of Tigers	0	8	4	12														
9.	Solve the equation $P = \frac{3Q - 2}{r}$ for $Q$ and simplify your answer (where $r \neq 0$ ).																	
10.	<p>This block of wood is a rectangular prism. What is the surface area of the block in square inches?</p> 																	
11.	Find all values of $x$ for which $2x^2 - 5x + 1 = 0$ .																	
12.	<p>A rescue helicopter is hovering 64 feet above a sailboat in distress. The helicopter drops a life raft. The height in feet, <math>h</math>, of the raft above the water can be modeled by <math>h(t) = -16t^2 + 64</math>, where <math>t</math> is the time in seconds after it is dropped. How many seconds after the raft is dropped will it hit the water?</p>																	
13.	Simplify this complex fraction: $\frac{3 - \frac{1}{a}}{3 + \frac{1}{a}}$																	
14.	Simplify $(4 \times 10^{-2})^3$ . Write the answer in scientific notation.																	
15.	<p>Find the range of the function in the given graph.</p> 																	
16.	Tesha bought $m$ magazines at $d$ dollars per magazine and $p$ paperback books at $2d + 1$ dollars per book. Write an expression that represents the total amount Tesha spent in dollars (before taxes).																	
17.	<p>What kind of function would best model the data below, where <math>x</math> is the independent variable and <math>y</math> is the dependent variable?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td><math>x</math></td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><math>y</math></td> <td>11</td> <td>9</td> <td>7</td> <td>5</td> <td>3</td> <td>1</td> <td>-1</td> </tr> </tbody> </table> <p>A. quadratic   B. rational   C. exponential   D. logarithmic   E. linear</p>	$x$	-3	-2	-1	0	1	2	3	$y$	11	9	7	5	3	1	-1	
$x$	-3	-2	-1	0	1	2	3											
$y$	11	9	7	5	3	1	-1											
18.	The quadratic equation $2x^2 + 5x = 3$ has two solutions. Find the <u>smaller</u> of the two solutions.																	

19.	Find the domain of the function defined by $f(x) = \sqrt{x+2}$ .																	
20.	Simplify the expression: $\frac{1}{3+\sqrt{5}}$																	
21.	Find the solution of the equation $3^{2x-3} = 81$ .																	
22.	Find an equivalent form of: $\frac{2}{a} - \frac{1}{b}$																	
23.	How high up, in feet, will a 15-foot ladder reach on the side of a building if the bottom of the ladder is placed 5 feet from the base of the building?																	
24.	Solve for $x$ : $2^x = \frac{2^a 2^b}{2^c}$																	
25.	<p>What kind of function would best model the data below, where <math>x</math> is the independent variable and <math>y</math> is the dependent variable?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td><math>x</math></td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><math>y</math></td> <td>-54</td> <td>-16</td> <td>-2</td> <td>0</td> <td>2</td> <td>16</td> <td>54</td> </tr> </tbody> </table> <p>A. quadratic    B. rational    C. cubic    D. linear    E. exponential</p>	$x$	-3	-2	-1	0	1	2	3	$y$	-54	-16	-2	0	2	16	54	
$x$	-3	-2	-1	0	1	2	3											
$y$	-54	-16	-2	0	2	16	54											
26.	<p>In the given right triangle, <math>\triangle QRS</math>, find the value of <math>\sin R</math>.</p> 																	
27.	Find an equation of the inverse of the function $x + 2y + 3 = 0$ .																	
28.	<p>Find the area of the shaded region of this circle in square inches. Leave your answer in terms of <math>\pi</math>.</p> 																	
29.	Simplify: $\frac{2}{x+1} + \frac{3}{x^2-1}$ (where $x \neq 1, -1$ )																	
30.	<p>In the given right triangle, <math>\triangle QRS</math>, write a trig equation that would correctly find the angle of elevation from point S to point R.</p> 																	

## Scrambled Answers for the Top 30 Missed Questions Puzzle

NOTE: There are more possible answers than questions, so choose carefully!

300%	linear	200%
$\tan S = \frac{7}{24}$	126	$\frac{1}{2}$
$x + 3y = 4$	$64 \times 10^{-6}$	$md + 2pd + p$
$\frac{\sqrt{5}}{8}$	$11 + 4\sqrt{7}$	$\frac{3 - \sqrt{5}}{4}$
$3a^3 + 1$	$\frac{2x + 1}{(x + 1)(x - 1)}$	$3x - y = 2$
2	$md \cdot p(2d + 1)$	$\frac{2b - a}{ab}$
$5x > -3$	$y = -2x - 3$	6
$4\pi$	$z^2 - x^2$	62
$\frac{ab}{c}$	$a + b - c$	$\frac{5}{(x + 1)(x - 1)}$
$Q = \frac{Pr + 2}{3}$	10	$\frac{3a - 1}{3a + 1}$
4	-1	125
-3	$6.4 \times 10^{-5}$	$-x - 2y - 3 = 0$
cubic	11	30
$6a^4$	$-5x \leq 3$	$\frac{24}{25}$
$\sqrt{z^2 - x^2}$	$16\pi$	$y \geq 0$
$\frac{1}{a - b}$	4	$y \geq 2$
$Q = \frac{r(P + 2)}{3}$	$\frac{-5 \pm \sqrt{17}}{4}$	$\frac{7}{2}$
$\frac{5 \pm \sqrt{17}}{4}$	$x \geq -2$	$10\sqrt{2}$

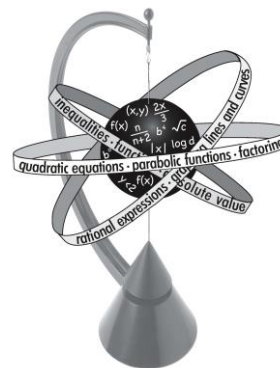
Visit our awesome website for a wealth of information about college math placement testing: [www.ncemtp.org](http://www.ncemtp.org)

# North Carolina Early Mathematics Placement Testing Program

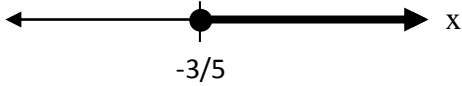
July 2016  
Volume 3

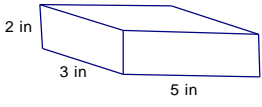
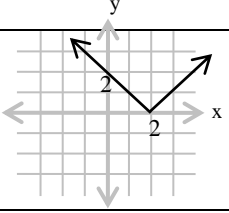
**KEY**

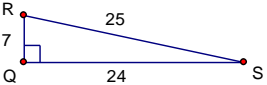
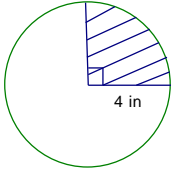
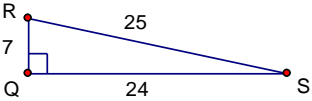
# TOP 30 MISSED Questions PUZZLE



These mathematics questions were most often answered incorrectly by high school students across North Carolina on NC EMPT practice placement test versions (2012-2013, 2013-2014, and 2014-2015). The questions are typical of those found on actual college math placement exams throughout UNC institutions and NC community colleges so it is important to practice and avoid the same errors. Pages 1-3 list the 30 questions. The last page contains the scrambled answers. Show all work for each problem on notebook paper and then write the correct answer from the last sheet next to the appropriate problem on pages 1-3.

	Question	Answer
1.	If the price of a jacket is reduced by 10%, the sale price is \$113.40. What was the original price in dollars?	126
2.	Simplify: $(2 + \sqrt{7})^2$	$11 + 4\sqrt{7}$
3.	The absolute value equation $ x - 2  = 3$ has two solutions. What is the <u>sum</u> of these solutions?	4
4.	Find an equation of a line that contains the point $(1,1)$ and is perpendicular to the line $y = 3x + 5$ .	$x + 3y = 4$
5.	Simplify: $\frac{6a^4 + 2a}{2a}$ (where $a \neq 0$ )	$3a^3 + 1$
6.	If one leg of a right triangle has length $x$ and the hypotenuse has length $z$ , then what is the length of the other leg?	$\sqrt{z^2 - x^2}$
7.	<p>Given: </p> <p>This is an illustration of the solution set for which inequality below?</p> <p>A. <math>5x &gt; -3</math>   B. <math>-5x \leq 3</math>   C. <math>5x \leq -3</math>   D. <math>-5x \geq -3</math>   E. <math>-5x &gt; 3</math></p>	$-5x \leq 3$

8.	<p>In the given table, the number of tigers at Zoo A is shown for various years. What is the percentage increase from 1990 to 2000?</p> <p style="text-align: center;">Tiger Population at Zoo A</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>1970</th> <th>1980</th> <th>1990</th> <th>2000</th> </tr> </thead> <tbody> <tr> <td>Number of Tigers</td> <td>0</td> <td>8</td> <td>4</td> <td>12</td> </tr> </tbody> </table>	Year	1970	1980	1990	2000	Number of Tigers	0	8	4	12	200%						
Year	1970	1980	1990	2000														
Number of Tigers	0	8	4	12														
9.	Solve the equation $P = \frac{3Q - 2}{r}$ for $Q$ and simplify your answer (where $r \neq 0$ ).	$Q = \frac{Pr + 2}{3}$																
10.	<p>This block of wood is a rectangular prism. What is the surface area of the block in square inches?</p> 	62																
11.	Find all values of $x$ for which $2x^2 - 5x + 1 = 0$ .	$\frac{5 \pm \sqrt{17}}{4}$																
12.	<p>A rescue helicopter is hovering 64 feet above a sailboat in distress. The helicopter drops a life raft. The height in feet, <math>h</math>, of the raft above the water can be modeled by <math>h(t) = -16t^2 + 64</math>, where <math>t</math> is the time in seconds after it is dropped. How many seconds after the raft is dropped will it hit the water?</p>	2																
13.	Simplify this complex fraction: $\frac{3 - \frac{1}{a}}{3 + \frac{1}{a}}$	$\frac{3a - 1}{3a + 1}$																
14.	Simplify $(4 \times 10^{-2})^3$ . Write the answer in scientific notation.	$6.4 \times 10^{-5}$																
15.	<p>Find the range of the function in the given graph.</p> 	$y \geq 0$																
16.	Tesha bought $m$ magazines at $d$ dollars per magazine and $p$ paperback books at $2d + 1$ dollars per book. Write an expression that represents the total amount Tesha spent in dollars (before taxes).	$md + 2pd + p$																
17.	<p>What kind of function would best model the data below, where <math>x</math> is the independent variable and <math>y</math> is the dependent variable?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td><math>x</math></td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><math>y</math></td> <td>11</td> <td>9</td> <td>7</td> <td>5</td> <td>3</td> <td>1</td> <td>-1</td> </tr> </tbody> </table> <p>A. quadratic   B. rational   C. exponential   D. logarithmic   E. linear</p>	$x$	-3	-2	-1	0	1	2	3	$y$	11	9	7	5	3	1	-1	linear
$x$	-3	-2	-1	0	1	2	3											
$y$	11	9	7	5	3	1	-1											
18.	The quadratic equation $2x^2 + 5x = 3$ has two solutions. Find the <u>smaller</u> of the two solutions.	-3																

19.	Find the domain of the function defined by $f(x) = \sqrt{x+2}$ .	$x \geq -2$																
20.	Simplify the expression: $\frac{1}{3+\sqrt{5}}$	$\frac{3-\sqrt{5}}{4}$																
21.	Find the solution of the equation $3^{2x-3} = 81$ .	$\frac{7}{2}$																
22.	Find an equivalent form of: $\frac{2}{a} - \frac{1}{b}$	$\frac{2b-a}{ab}$																
23.	How high up, in feet, will a 15-foot ladder reach on the side of a building if the bottom of the ladder is placed 5 feet from the base of the building?	$10\sqrt{2}$																
24.	Solve for $x$ : $2^x = \frac{2^a 2^b}{2^c}$	$a+b-c$																
25.	<p>What kind of function would best model the data below, where <math>x</math> is the independent variable and <math>y</math> is the dependent variable?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td><math>x</math></td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td><math>y</math></td> <td>-54</td> <td>-16</td> <td>-2</td> <td>0</td> <td>2</td> <td>16</td> <td>54</td> </tr> </tbody> </table> <p>A. quadratic    B. rational    C. cubic    D. linear    E. exponential</p>	$x$	-3	-2	-1	0	1	2	3	$y$	-54	-16	-2	0	2	16	54	cubic
$x$	-3	-2	-1	0	1	2	3											
$y$	-54	-16	-2	0	2	16	54											
26.	<p>In the given right triangle, <math>\triangle QRS</math>, find the value of <math>\sin R</math>.</p> 	$\frac{24}{25}$																
27.	Find an equation of the inverse of the function $x + 2y + 3 = 0$ .	$y = -2x - 3$																
28.	<p>Find the area of the shaded region of this circle in square inches. Leave your answer in terms of <math>\pi</math>.</p> 	$4\pi$																
29.	Simplify: $\frac{2}{x+1} + \frac{3}{x^2-1}$ (where $x \neq 1, -1$ )	$\frac{2x+1}{(x+1)(x-1)}$																
30.	<p>In the given right triangle, <math>\triangle QRS</math>, write a trig equation that would correctly find the angle of elevation from point S to point R.</p> 	$\tan S = \frac{7}{24}$																

## Scrambled Answers for the Top 30 Missed Questions Puzzle

NOTE: There are more possible answers than questions, so choose carefully!

300%	linear	200%
$\tan S = \frac{7}{24}$	126	$\frac{1}{2}$
$x + 3y = 4$	$64 \times 10^{-6}$	$md + 2pd + p$
$\frac{\sqrt{5}}{8}$	$11 + 4\sqrt{7}$	$\frac{3 - \sqrt{5}}{4}$
$3a^3 + 1$	$\frac{2x + 1}{(x + 1)(x - 1)}$	$3x - y = 2$
2	$md \cdot p(2d + 1)$	$\frac{2b - a}{ab}$
$5x > -3$	$y = -2x - 3$	6
$4\pi$	$z^2 - x^2$	62
$\frac{ab}{c}$	$a + b - c$	$\frac{5}{(x + 1)(x - 1)}$
$Q = \frac{Pr + 2}{3}$	10	$\frac{3a - 1}{3a + 1}$
4	-1	125
-3	$6.4 \times 10^{-5}$	$-x - 2y - 3 = 0$
cubic	11	30
$6a^4$	$-5x \leq 3$	$\frac{24}{25}$
$\sqrt{z^2 - x^2}$	$16\pi$	$y \geq 0$
$\frac{1}{a - b}$	4	$y \geq 2$
$Q = \frac{r(P + 2)}{3}$	$\frac{-5 \pm \sqrt{17}}{4}$	$\frac{7}{2}$
$\frac{5 \pm \sqrt{17}}{4}$	$x \geq -2$	$10\sqrt{2}$

Visit our awesome website for a wealth of information about college math placement testing: [www.ncempt.org](http://www.ncempt.org)