

## Mathematics Placement Measures

### SAMPLE SCREEN SHOT

The figure below shows a sample item similar to those in the Algebra Placement Test and illustrates how a mathematics test item would appear on the computer screen. Students use the mouse to select an answer and then click on the "Go On" button to proceed to the next computer-selected question. The sample items on the following pages provide examples of the contents of each of the five mathematics placement test pools and several of the mathematics diagnostic test pools.

NOTE: The mathematics pools for COMPASS/ESL have been calibrated to accommodate calculator-permitted administrations. The estimated effect of calculator use has been accounted for in the item calibrations in a manner that allows scores to be interpreted the same as were scores produced in earlier versions of COMPASS.

**Clicking on the "Calculator" button from any COMPASS mathematics test screen will bring up the default Windows® calculator.**

The screenshot shows a computer window titled "COMPASS Math Test". In the top right corner of the window, there are two buttons: "Calculator" and "HELP". The main content area contains a math problem: "A student has earned scores of 87, 81, and 88 on the first 3 of 4 tests. If the student wants an average (arithmetic mean) of exactly 87, what score must she earn on the fourth test?". Below the question are five multiple-choice options, each with a radio button: A. 85, B. 86, C. 87, D. 92, and E. 93. In the bottom right corner of the window, there is a "Go On" button.

## NUMERICAL SKILLS/PREALGEBRA PLACEMENT

<u>Content Areas</u>	<u>Percentage of Items in Pool</u>
Basic operations with integers	16
Basic operations with fractions	17
Basic operations with decimals	14
Exponents, square roots, and scientific notation	13
Ratios and proportions	8
Percentages	15
Conversions between fractions and decimals	<1
Multiples and factors of integers	2
Absolute values of numbers	2
Averages (means, medians, and modes)	9
Order concepts (greater than; less than)	<1
Estimation skills	<1
Number theory	<1
Counting problems and simple probability	1
Range	1

### (Averages: Means, Medians, and Modes)

1. What is the average (arithmetic mean) of 8, 7, 7, 5, 3, 2, and 2?

- A.  $3\frac{4}{7}$
- B.  $4\frac{5}{6}$
- C.  $4\frac{6}{7}$
- D. 5
- E.  $6\frac{4}{5}$

**(Basic Operations with Decimals)**

2. Ben is making wooden toys for the next arts and crafts sale. Each toy costs Ben \$1.80 to make. If he sells the toys for \$3.00 each, how many will he have to sell to make a profit of exactly \$36.00 ?
- A.** 12  
**B.** 20  
**C.** 30  
**D.** 60  
**E.** 108

**(Basic Operations with Fractions)**

3. How many yards of material from a 24-yard length of cloth remain after 3 pieces, each  $3\frac{1}{2}$  yards long, and 5 pieces, each  $2\frac{1}{4}$  yards long, are removed?
- A.**  $2\frac{1}{4}$   
**B.**  $4\frac{1}{4}$   
**C.**  $4\frac{5}{6}$   
**D.**  $10\frac{1}{4}$   
**E.**  $10\frac{5}{6}$

**(Percentages)**

4. Phillip charged \$400 worth of goods on his credit card. On his first bill, he was not charged any interest, and he made a payment of \$20. He then charged another \$18 worth of goods. On his second bill a month later, he was charged 2% interest on his entire unpaid balance. How much interest was Phillip charged on his second bill?
- A.** \$8.76  
**B.** \$7.96  
**C.** \$7.60  
**D.** \$7.24  
**E.** \$6.63

## ALGEBRA PLACEMENT

The Algebra Placement Test comprises topics from three major mathematics curricular areas, as follows:

<u>Curricular Area</u>	<u>Content Areas</u>	<u>Percentage of Items in Pool</u>
<b>Elementary Algebra</b>		<b>57</b>
	Substituting values into algebraic equations	7
	Setting up equations for given situations	7
	Basic operations with polynomials	7
	Factoring of polynomials	7
	Solving polynomial equations by factoring	3
	Formula manipulation and field axioms	2
	Linear equations in one variable	16
	Exponents and radicals	5
	Linear inequalities in one variable	1
<b>Intermediate Algebra</b>		<b>15</b>
	Rational expressions	7
	Exponents and radicals	5
	Systems of linear equations in two variables	2
	Quadratic formulas	<1
	Absolute value equations and inequalities	<1
<b>Coordinate Geometry</b>		<b>27</b>
	Linear equations in two variables	13
	Distance formulas in the plane	3
	Graphing conics (circle, parabola, etc.)	3
	Graphing parallel lines	1
	Graphing perpendicular lines	1
	Graphing relations in the plane	4
	Graphing systems of equations and rational functions	1
	Midpoint formulas	<1

**(Elementary Algebra: Linear Equations in One Variable)**

1. A student has earned scores of 87, 81, and 88 on the first 3 of 4 tests. If the student wants an average (arithmetic mean) of exactly 87, what score must she earn on the fourth test?
- A. 85
  - B. 86
  - C. 87
  - D. 92
  - E. 93

**(Elementary Algebra: Basic Operations with Polynomials)**

2. Which of the following expressions represents the product of 3 less than twice  $x$  and 2 more than the quantity 3 times  $x$ ?
- A.  $-6x^2 + 25x + 6$
  - B.  $6x^2 + 5x + 6$
  - C.  $6x^2 - 5x + 6$
  - D.  $6x^2 - 5x - 6$
  - E.  $6x^2 - 13x - 6$

**(Elementary Algebra: Substituting Values into Algebraic Expressions)**

3. If  $x = -1$  and  $y = 2$ , what is the value of the expression  $2x^3 - 3xy$ ?
- A. 8
  - B. 4
  - C. -1
  - D. -4
  - E. -8

(Intermediate Algebra: Rational Expressions)

4. For all  $r \neq \pm 2$ ,  $\frac{r^2 - 5r + 6}{r^2 - 4} = ?$

A.  $\frac{r-3}{r+2}$

B.  $\frac{r-2}{r+2}$

C.  $\frac{r-2}{r+3}$

D.  $\frac{r+3}{r-2}$

E.  $\frac{r+3}{r+2}$

(Coordinate Geometry: Linear Equations in Two Variables)

5. What is the equation of the line that contains the points with  $(x,y)$  coordinates  $(-3,7)$  and  $(5,-1)$  ?

A.  $y = 3x - 2$

B.  $y = x + 10$

C.  $y = -\frac{1}{3}x + 8$

D.  $y = -\frac{3}{2}x + \frac{11}{4}$

E.  $y = -x + 4$

## COLLEGE ALGEBRA PLACEMENT

<u>Content Areas</u>	<u>Percentage of Items in Pool</u>
Functions	40
Exponents	25
Complex numbers	15
Arithmetic and geometric sequences and series	7
Factorials	6
Matrices (basic operations, equations, and determinants)	3
Systems of linear equations in three or more variables	1
Logic and proof techniques	1
Roots of polynomials	2

## (Complex Numbers)

1. For  $i = \sqrt{-1}$ , if  $3i(2 + 5i) = x + 6i$ , then  $x = ?$
- A.  $-15$
  - B.  $5$
  - C.  $5i$
  - D.  $15i$
  - E.  $27i$

## (Functions)

2. If  $f(4) = 0$  and  $f(6) = 6$ , which of the following could represent  $f(x)$ ?
- A.  $\frac{3}{5}x - 4$
  - B.  $x + 2$
  - C.  $x - 4$
  - D.  $\frac{3}{2}x + 6$
  - E.  $3x - 12$

## GEOMETRY PLACEMENT

### Content Areas

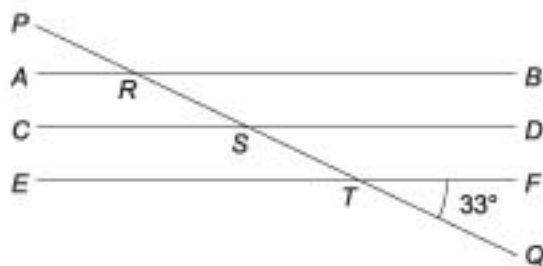
### Percentage of Items in Pool

Triangles (perimeter, area, Pythagorean theorem, etc.)	58
Circles (perimeter, area, arcs, etc.)	15
Angles (supplementary, complementary, adjacent, vertical, etc.)	12
Rectangles (perimeter, area, etc.)	4
Three-dimensional concepts	4
Hybrid (composite) shapes	4
Trapezoids	2
Parallelograms	<1
Logic and proof techniques	<1

### (Angles)

1. In the figure below  $\overline{AB}$ ,  $\overline{CD}$ , and  $\overline{EF}$  are parallel, and  $\overline{PQ}$  intersects all 3 lines at points  $R$ ,  $S$ , and  $T$ , respectively. If the measure of  $\angle QTF$  is  $33^\circ$ , what is the measure of  $\angle PRB$ ?

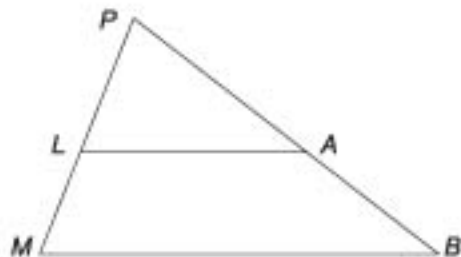
- A.  $33^\circ$   
 B.  $57^\circ$   
 C.  $66^\circ$   
 D.  $123^\circ$   
 E.  $147^\circ$



### (Triangles)

2. In  $\triangle MPB$  below,  $\overline{LA} \parallel \overline{MB}$ . If  $\frac{PL}{LM} = \frac{5}{3}$ , then  $\frac{PA}{AB} = ?$

- A.  $\frac{5}{3}$   
 B.  $\frac{5}{8}$   
 C.  $\frac{5}{13}$   
 D.  $\frac{5}{10}$   
 E.  $\frac{5}{15}$



## TRIGONOMETRY PLACEMENT

<u>Content Areas</u>	<u>Percentage of Items in Pool</u>
Trigonometric functions and identities	35
Right-triangle trigonometry	27
Trigonometric equations and inequalities	10
Graphs of trigonometric functions	20
Special angles (multiples of 30 and 45 degrees)	8
Polar coordinates	<1

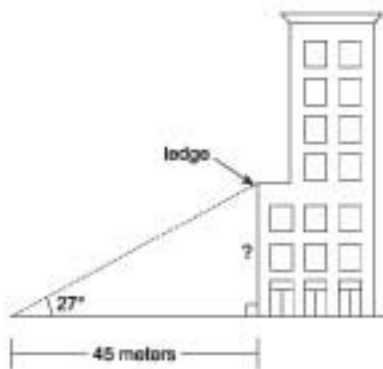
**(Trigonometric Functions and Identities)**

1. Which of the following is equivalent to  $\frac{1 - \cos^2 \theta}{\cos^2 \theta}$  ?
- A.  $\sec^2 \theta$
- B.  $(\csc^2 \theta) - 1$
- C.  $\tan^2 \theta$
- D.  $\sin^2 \theta$
- E.  $-\frac{1}{\sin^2 \theta}$

**(Right-Triangle Trigonometry)**

2. From a point on the ground the angle of elevation to a ledge on a building is  $27^\circ$ , and the distance to the base of the building is 45 meters. How many meters high is the ledge?

- A.  $\frac{45}{\sin 27^\circ}$
- B.  $\frac{45}{\tan 27^\circ}$
- C.  $45 \sin 27^\circ$
- D.  $45 \cos 27^\circ$
- E.  $45 \tan 27^\circ$



## Answers to Sample Items

### Numerical Skills/Prealgebra Placement Test

1. C   2. C   3. A   4. B

### Algebra Placement Test

1. D   2. D   3. B   4. A   5. E

### College Algebra Placement Test

1. A   2. E

### Geometry Placement Test

1. E   2. C

### Trigonometry Placement Test

1. C   2. E

### Numerical Skills/Prealgebra Diagnostic Test

1. E   2. E   3. C

### Algebra Diagnostic Test

1. C   2. A   3. A

### Reading Placement Test: Sample Passage 1 Humanities

1. D   2. B

### Reading Placement Test: Sample Passage 2 Practical Reading

1. A   2. C

### Vocabulary Diagnostic Test

1. B   2. D   3. E   4. C

### Reading Comprehension Diagnostic Test

1. B   2. D

### Writing Skills Placement Test

1. A   2. B   3. D   4. E

### Writing Skills Diagnostic Test

1. D   2. C   3. B   4. B   5. spring   6. A   7. D   8. B   9. C   10. D