

ACT MATHEMATICS TEST *PREPARATION GUIDE*

FREQUENTLY ASKED QUESTIONS ABOUT THE ACT

Q: Who administers the ACT?

A: The ACT is administered by the American College Testing Program. You may visit their website at www.act.org.

Q: What is the structure of the ACT assessment?

A: The ACT assessment consists of four tests. The English Test contains approximately 75 questions and lasts approximately 45 minutes. The Mathematics Test contains 60 questions and lasts 60 minutes. The Reading Test contains 40 questions and lasts 35 minutes. The Science Reasoning Test contains 40 questions and lasts 35 minutes. All four tests consist of multiple choice questions.

Q: How is the ACT assessment scored?

A: Each test is scored from 1 to 36. A composite score is also scored from 1 to 36.

Q: How do colleges use the information from Student Profile Reports?

A: Most colleges use the information on your SPR in two ways: (1) as part of the admission process, to assess your ability to do college-level work and (2) to help you plan your appropriate program of study.

Q: May I take the ACT assessment more than once?

A: Yes.

Q: What materials may I bring to the ACT Test?

A: You may bring your test center admission form; three sharpened number two pencils; a good eraser; positive identification; a watch; and a permitted calculator.

Q: Should I guess?

A: Yes. There is no penalty for guessing, so it is to your advantage to answer every question.

Q: How should I prepare for the ACT assessment?

A: Understanding and practicing test-taking strategies will help a great deal. Subject matter review is particularly useful for the Mathematics Test and the English Test.

Q: How often is the test given?

A: The test is given in October, December, February, April, and June.

TWO SUCCESSFUL APPROACHES FOR IMPROVING TEST SCORES

I. The "Plus-Minus" System

Many who take the ACT don't get their best possible score because they spend too much time on difficult questions, leaving insufficient time to answer easy questions. Don't let this happen to you. Since every question is worth the same amount, use the following system.

1. Answer easy questions immediately.
2. When you come to a question that seems "impossible" to answer, mark a large minus sign ("-") next to it on your test booklet.
3. Then mark a "guess" answer on your answer sheet and move on the next question.
4. When you come to a question that seems solvable but appears too time consuming, mark a large plus sign ("+") next to that question in your test booklet and register a "guess" answer on your answer sheet. The move on the next question.

Since your time allotment is usually less than one minute per question, a "time consuming" question is a question that you estimate will take you more than a minute or two to answer. But don't waste time deciding whether a question is a "+" or a "-" Act quickly, as the intent of this strategy is, in fact, to save you valuable time.

After working all the easy questions, your booklet should look something like this:

- 1.
- + 2.
- 3.
- 4.
- + 5.
- Etc.

5. After working all the problems you can do immediately in that section (the easy ones), go back and work your "+" problems. Change your "guess" on your answer sheet, if necessary, for those problems you are able to work.
6. If you finish with your "+" problems and still have time left, you can either
 - a. Attempt those "-" questions – the ones that you consider "impossible." Sometimes a problem later in that section will "trigger" your memory, and you'll be able to go back and answer one of the earlier "impossible" problems.
 - b. Or don't bother with those "impossible" questions. Rather spend your time reviewing your work to be sure you didn't make any careless mistakes on the questions you thought were easy.

II. The Elimination Strategy

Take advantage of being allowed to mark in your testing booklet. As you eliminate an answer choice from consideration, make sure to *mark it out* in your question booklet as follows:

~~(A)~~

?(B)

(C)

~~(D)~~

?(E)

Notice that some choices are marked with question marks, signifying that they may be possible answers. This technique will help you avoid reconsidering those choice you have already eliminated. It will also help you narrow down your possible answers

AN INTRODUCTION TO THE MATHEMATICS TEST

The Mathematics Test is 60 minutes in length and contains 60 questions.

Ability Tested

The mathematics test evaluates your ability to solve mathematical problems by using reasoning, problem-solving insight, logic, and application of basic and advanced skills learned in high school.

Basic Skills Necessary

The basic skills necessary to do well on this test include high school arithmetic, elementary and intermediate algebra, coordinate geometry, plane geometry, and trigonometry, along with some logical insight into problem-solving situations. The three skill levels covered include: using the basic skills, applying math skills to different situations, and analyzing when and why operations will and will not yield a solution.

Directions

In the Mathematics Test, each of the problems includes five possible choices. You are to solve each problem and choose the *best* correct answer.

Analysis of Directions

You are looking for one correct answer; therefore, although other answers may be close, there is never more than once right answer. Approximating can be a valuable tool, except

its value is greatly diminished when one of the choices is “none of these.” In this case, you must get an exact answer and cannot merely select the closest one.

Content Area Breakdown (Approximate Percentages)

<i>Contents/Skills</i>	<i>Number of Items</i>	<i>Percentages</i>
Pre-Algebra and Elementary Algebra	24	40%
Intermediate Algebra and Coordinate Geometry	18	30%
Plane Geometry	14	23%
Trigonometry	4	7%
Total	60	100%

Here is the content area breakdown for River Valley High School’s Curriculum and Course Offering:

ALGEBRA 1	20%
GEOMETRY	30%
ALGEBRA 2	30%
ALGEBRA 3	13%
TRIGONOMETRY	7%

IMPORTANT TERMINOLOGY, FORMULAS, AND GENERAL MATHEMATICAL INFORMATION THAT YOU SHOULD BE FAMILIAR WITH

COMMON MATH TERMS

Natural numbers – the counting numbers; 1,2,3,...

Whole numbers – the counting numbers beginning with zero; 0,1,2,3,...

Integers – positive and negative whole numbers and zero; ..., -3, -2, -1, 0, 1, 2, 3, ...

Rational numbers – fractions such as $\frac{3}{2}$ or $\frac{7}{8}$. Since a number such as 5 may be written

as $\frac{5}{1}$, all integers are rational numbers.

Irrational numbers – examples of irrational numbers are $\sqrt{3}$ and π .

Real numbers – real numbers consist of all rational and irrational numbers.

Imaginary numbers – numbers which involve square roots of negative numbers;

$\sqrt{-1} = i, \sqrt{-2} = i\sqrt{2}, \sqrt{-3} = i\sqrt{3}, \sqrt{-4} = 2i, \dots$

Complex numbers – numbers in the form $a+bi$ where a and b are real numbers; $3+2i, 5+3i, 7-5i, \dots$

Odd numbers – numbers not divisible by 2; 1,3,5,7,...

Even numbers – numbers divisible by 2; 0,2,4,6,...

Prime numbers – number divisible by only 1 and itself; 2,3,5,7,11,13,...

Composite number – number divisible by more than just 1 and itself; 4,6,8,9,10,12,14,15,...

MATH FORMULAS

Triangle	Perimeter = side + side + side Area = $(1/2) * \text{base} * \text{height}$
Square	Perimeter = $4 * \text{side}$ Area = $\text{side} * \text{side}$
Rectangle	Perimeter = $2 * (\text{base} + \text{height})$ or $2b + 2h$ Area = $\text{base} * \text{height}$
Parallelogram	Perimeter = $2 * (\text{length} + \text{width})$ Area = $\text{base} * \text{height}$
Trapezoid	Area = $(1/2) * H * (\text{BASE} + \text{base})$
Circle	Circumference = $2\pi r$ or πd Area = $\pi * r^2$
Pythagorean Theorem (for right triangles)	$a^2 + b^2 = c^2$ The sum of the squares of the legs of a right triangle equals the square of the hypotenuse.
Cube	Volume = $\text{side} * \text{side} * \text{side}$ Surface Area = $\text{side} * \text{side} * 6$
Rectangular Prism	Volume = $\text{length} * \text{width} * \text{height}$ Surface Area = $2(lw) + 2(lh) + 2(wh)$

IMPORTANT EQUIVALENTS

$1/100 = .01 = 1\%$	$1/10 = .1 = 10\%$	$1/5 = 2/10 = .2 = .20 = 20\%$
$3/10 = .3 = .30 = 30\%$	$2/5 = 4/10 = .4 = .40 = 40\%$	$1/2 = 5/10 = .5 = .50 = 50\%$
$3/5 = 6/10 = .6 = .60 = 60\%$	$7/10 = .7 = .70 = 70\%$	$4/5 = 8/10 = .8 = .80 = 80\%$
$9/10 = .9 = .90 = 90\%$		

MEASURES

Customary System, or English System

Length

12 inches = 1 foot	1760 yards = 1 mile
3 feet = 1 yard	5280 feet = 1 mile
36 inches = 1 yard	5.5 yards = 1 rod

Area

144 square inches = 1 square foot	9 square feet = 1 square yard
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Weight

16 ounces = 1 pound	2000 pounds = 1 ton
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Capacity

8 fluid ounces = 1 cup	4 quarts = 1 gallon
2 cups = 1 pint	8 dry quarts = 1 peck
2 pints = 1 quart	4 pecks = 1 bushel

Time

365 days = 1 year	10 years = 1 decade
52 weeks = 1 year	100 years = 1 century

Metric System, or The International System of Units

Length-meter

Kilometers=1000meters

Hectometer=100meters

Dekameter=10meters

10decimeters=1meter

100centimeters=1meter

1000millimeters=1meter

Volume-liter

1000milliliters=1liter

1000liters=1kiloliter

Mass-gram

1000milligrams=1gram

1000grams=1kilogram

1000kilograms=1metric ton

MATHEMATICAL WORDS AND PHRASES

Words that signal an operation:

ADDITION	MULTIPLICATION
Sum	Of
Total	Product
Plus	Times
Increase	At (sometimes)
More than	Total (sometimes)
Greater Than	
SUBTRACTION	DIVISION
Difference	Quotient
Less	Divisor
Decreased	Dividend
Reduced	Ratio
Fewer	Parts
Have left	

GEOMETRY TERMS AND BASIC INFORMATION

Angles

Vertical Angles – Formed by two intersecting lines, across from each other, always equal

Adjacent Angles – Next to each other, share a common side and vertex

Right Angle – Measures 90 degrees

Obtuse Angle – Greater than 90 degrees

Acute Angle – Less than 90 degrees

Straight Angle, or Line – Measures 180 degrees

Angle Bisector – Divides an angles into two equal angles

Supplementary Angles – Two angles whose total is 180 degrees

Complementary Angles – Two angles whose total is 90 degrees

Lines

Two points determine a line.

Parallel Lines – Never meet; slopes are the same.

Perpendicular Lines – Meet at right angles; slopes are opposite reciprocals.

Polygons

Polygon – A many-sided (more than two) closed figure.

Regular Polygon – A polygon with all sides and all angles equal.

Triangle – Three sided polygon; the interior angles total 180 degrees.

Equilateral Triangle – All sides equal.

Isosceles Triangle – Two sides equal.

Scalene Triangle – All sides of different lengths.

Right Triangle – A triangle containing a right angle.

In a triangle – Angles opposite equal sides are equal.

In a triangle – The longest side is across from the largest angle, and the shortest side is across from the shortest angle.

In a triangle – The sum of any two sides of a triangle is larger than the third side.

In a triangle – An exterior angle is equal to the sum of the remote two angles.

Median of a triangle – A line segment that connects the vertex and the midpoint of the opposite side.

Quadrilateral – Four sided polygon; the interior angles total 360 degrees.

Parallelogram – A quadrilateral with opposite sides parallel.

Rectangle – A parallelogram with all right angles.

Rhombus – A parallelogram with equal sides.

Square – A parallelogram with equal sides and all right angles.

Trapezoid – A quadrilateral with two parallel sides.

Pentagon – A five sided polygon.

Hexagon – A six sided polygon.

Octagon – An eight sided polygon.

Circles

Radius of a circle – A line segment from the center of the circle to the circle itself.

Diameter of a circle – A line segment that starts and ends on the circle and goes through the center.

Chord – A line segment that starts and ends on the circle.

Arc – A part of the circle.

A FEW IMPORTANT REMINDERS ABOUT POLYNOMIALS

The Laws of Operations on Polynomials

LAW	ADDITION	MULTIPLICATION
Commutative	$a+(b+c)=(c+b)+a=(b+c)+a$	$a(bc)=(bc)a=(cb)a$
Associative	$(a+b)+c=a+(b+c)$	$(ab)c=a(bc)$
Distributive	$x(a+b-c)=xa+xb-xc$	

Laws of Exponents

$$a^m \cdot a^n = a^{m+n}$$

$$(a^m)^n = a^{mn}$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

THE QUADRATIC FORMULA

For a quadratic equation in the form $ax^2 + bx + c = 0$, the following quadratic formula is often used:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

By using the first the + and then the – sign before the radical we obtain two roots of the quadratic equation.

SOME BASIC TRIGONOMETRIC RATIOS

$\sin \theta = \frac{\textit{OppositeSide}}{\textit{Hypotenuse}}$	$\csc \theta = \frac{\textit{Hypotenuse}}{\textit{OppositeSide}}$
$\cos \theta = \frac{\textit{AdjacentSide}}{\textit{Hypotenuse}}$	$\sec \theta = \frac{\textit{Hypotenuse}}{\textit{AdjacentSide}}$
$\tan \theta = \frac{\textit{OppositeSide}}{\textit{AdjacentSide}}$	$\cot \theta = \frac{\textit{AdjacentSide}}{\textit{OppositeSide}}$

The Reciprocal Relations

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

The Quotient Relations

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

The Pythagorean Relations

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

SOME BASIC LOGARITHMS

$$\text{Log}_{10} 1 = 0$$

$$\text{Log}_{10} 10 = 1$$

$$\text{Log}_{10} 100 = 2$$

$$\text{Log}_{10} 1000 = 3$$

$$\text{Log}_2 8 = 3$$

$$\text{Log}_3 9 = 2$$

$$\text{Log}_2 16 = 4$$

ACT Mathematics Practice Test #1

1.) The product of x and y is a constant. If the value of x is increased by 50%, by what percentage must the value of y be decreased?

A. 25%	B. $33\frac{1}{3}\%$	C. 40%	D. 50%	E. $66\frac{2}{3}\%$
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2.) One hundred students will attend a dance if tickets cost 30 cents each. For each 5 cent raise in the price of tickets, 10 fewer students will attend. What price will deliver the maximum dollar sales?

F. 30	G. 35	H. 40	J. 45	K. 50
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3.) What is the area of the rectangle if its length is 36 and its diagonal is 39?

A. 1404	B. 702	C. 540	D. 108	E. 75
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4.) Bryan needs 5 shelves for books. The longest shelf is to be the bottom shelf, and each shelf above is to be 4 inches shorter than the one immediately below. If the sum of the lengths of the shelves is 155 inches, what is the length of the longest shelf?

F. 23 inches	G. 28 inches	H. 31 inches	J. 36 inches	K. 39 inches
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5.) If $3x+2y=14$ and $3x=2y$, what is the value of $x+y$?

A. 6	B. $5\frac{5}{6}$	C. $5\frac{1}{6}$	D. $4\frac{5}{6}$	E. $3\frac{1}{2}$
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6.) A square and a circle have the same area. What is the circumference of the circle if the perimeter of the square is 8 times the square root of π ?

F. 4	G. 4π	H. $\sqrt{2}\pi$	J. 8π	K. $8\sqrt{\pi}$
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7.) In a class of 200 students, 120 study Spanish and 100 study French. If a student must study at least one of these two languages, what percent of the students study French but not Spanish?

A. 80%	B. 60%	C. 40%	D. 20%	E. 10%
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8.) During one season, a tennis team won 21 matches and lost 30% of their matches. What was the number of matches the team lost?

F. 70	G. 30	H. 9	J. 7	K. 5
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9.) A drawer contains red socks, black socks, and white socks. What is the least number of socks that must be taken out of the drawer sight unseen to be sure of having 4 pairs of socks? (A pair is 2 socks of the same color.)

A. 8	B. 10	C. 12	D. 14	E. 16
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10.) If the angles of a triangle are $3x$, $x+10$, and $2x-40$, what is the measure of the smallest angle?

F. 30	G. 35	H. 40	J. 45	K. 50
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11.) $(x+3)(2x+4)=?$

A. $2x^2 + 10x + 12$	B. $x^2 + 5x + 6$	C. $2x^2 + 6x + 12$	D. $x^2 + 3x + 6$	E. $2x^2 + 2x + 12$
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12.) Simplify $\left(\frac{\sqrt{20}}{\sqrt{10}}\right)\left(\frac{\sqrt{60}}{\sqrt{80}}\right)$

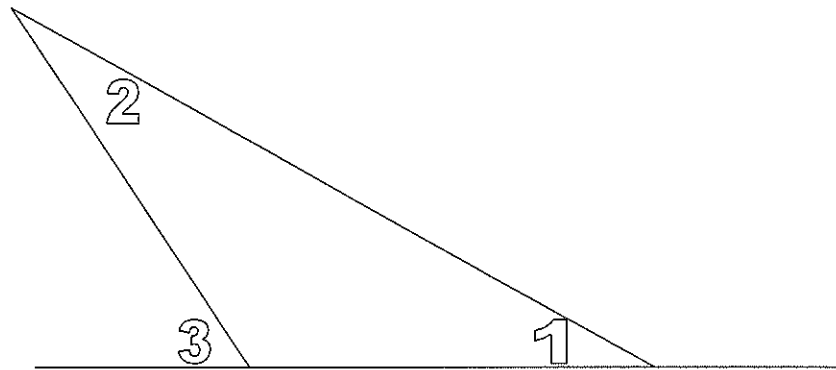
F. $\frac{5\sqrt{6}}{4}$	G. $\frac{8\sqrt{2}}{5}$	H. $\frac{\sqrt{8}}{2}$	J. $\frac{\sqrt{6}}{2}$	K. $\sqrt{3}$
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13.) If A is greater than B, C is less than A, and B is greater than C, then which of the following is true?

A. $A < B < C$	B. $B < A < C$	C. $B < C < A$	D. $C < A < B$	E. $C < B < A$
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14.) Which of the following is (are) always true about the figure?

- I. $\angle 1 + \angle 2 = \angle 3$ II. $\angle 3 > \angle 2$ III. $180^\circ > \angle 2 + \angle 3$



F. I and II only	G. II and III only	H. I and III only	J. I only	K. II only
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15.) Simplify $\frac{12x^6y^4z^2}{6x^2y^4z^8}$

A. $\frac{2x^4}{z^6}$	B. $\frac{2x^8y^8z^{10}}{1}$	C. $6x^4z^{-6}$	D. $\frac{2x^3}{z^4}$	E. $\frac{2x^6}{z^4}$
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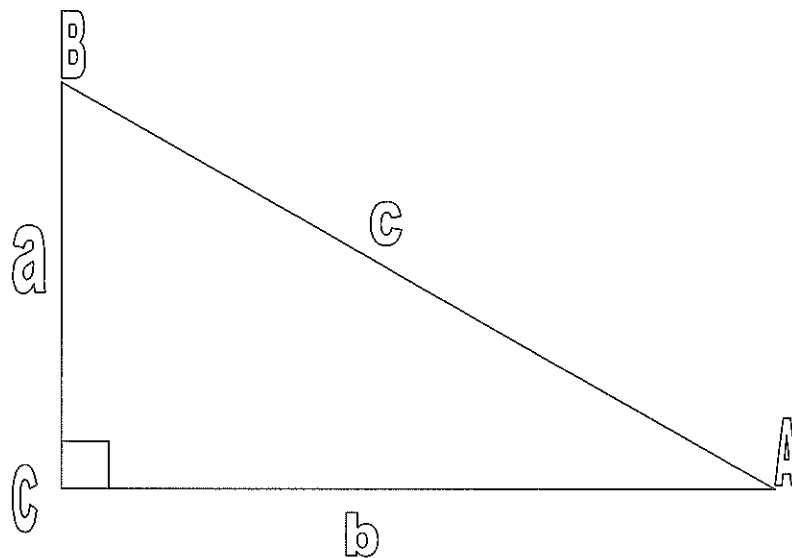
16.) Logan has a basketball court that is 30 feet by 50 feet in size. He needs a grass strip around it. How wide must the strip be to provide 900 square feet of grass?

F. 3feet	G. 4feet	H. 5feet	J. 6feet	K. 7feet
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17.) Two hikers leave the same point and travel at right angles to each other. At the end of two hours, they are ten miles apart. If one walks 1 mile per hour faster than the other, what is the speed of the slower hiker?

A. 2mph	B. 3mph	C. 4mph	D. 5mph	E. 6mph
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18.) Which of the following is (are) not necessarily true about the figure below?



F. $\sin^2 A + \cos^2 A = 1$	G. $\frac{\sin A}{\cos A} = \tan A$	H. $b \sin A = a \sin B$	J. $\tan A + \tan B = \frac{c^2}{ab}$	K. All are true
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19.) Which equation below has roots that are each 4 less than the roots of $3x^2 + 2x - 4 = 0$?

A. $3x^2 + 14x - 12 = 0$	B. $3x^2 + 26x + 52 = 0$	C. $6x^2 + 3x - 28 = 0$	D. $6x^2 + 16x + 9 = 0$	E. $3x^2 - 15x - 18 = 0$
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20.) Which of the following could not be a solution to $4 - 3x < -3$?

F. 4	G. 3.5	H. 3	J. 2.5	K. 2
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21.) If the sum of a positive number and its square is 240, what is the number?

A. 10	B. 12	C. 14	D. 15	E. 16
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22.) A tank 4 inches high is to be made from a square piece of sheet metal by cutting a square out of each corner and folding up the sides. The volume of the tank is to be 900 cubic inches. What is the width of the piece of sheet metal?

F. 12	G. 15	H. 19	J. 21	K. 23
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23.) Macey is three times as old as Mike. In 8 years, she will be twice as old as Mike. How old was Macey 3 years ago?

A. 5	B. 8	C. 21	D. 24	E. 27
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24.) What is the area of an equilateral triangle if its perimeter is 30?

F. 50	G. $50\sqrt{3}$	H. 25	J. $25\sqrt{3}$	K. $10\sqrt{3}$
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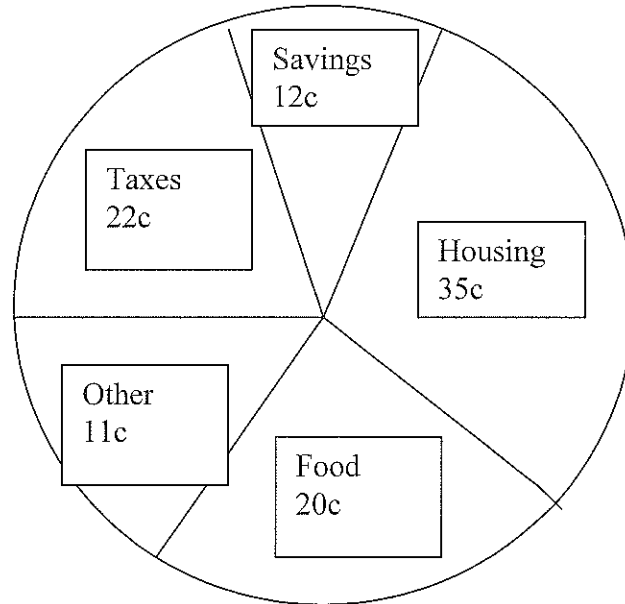
25.) Ellen can mow a lawn in 2 hours. Dave can mow the same lawn in $1\frac{1}{2}$ hours. About how long will it take to mow the lawn if Ellen and Dave worked together?

A. 210min	B. 90min	C. 51min	D. 48min	E. 30min
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26.) What is the value of $\frac{(x^{2y+2})(x^{6y-1})}{x^{4y-3}}$?

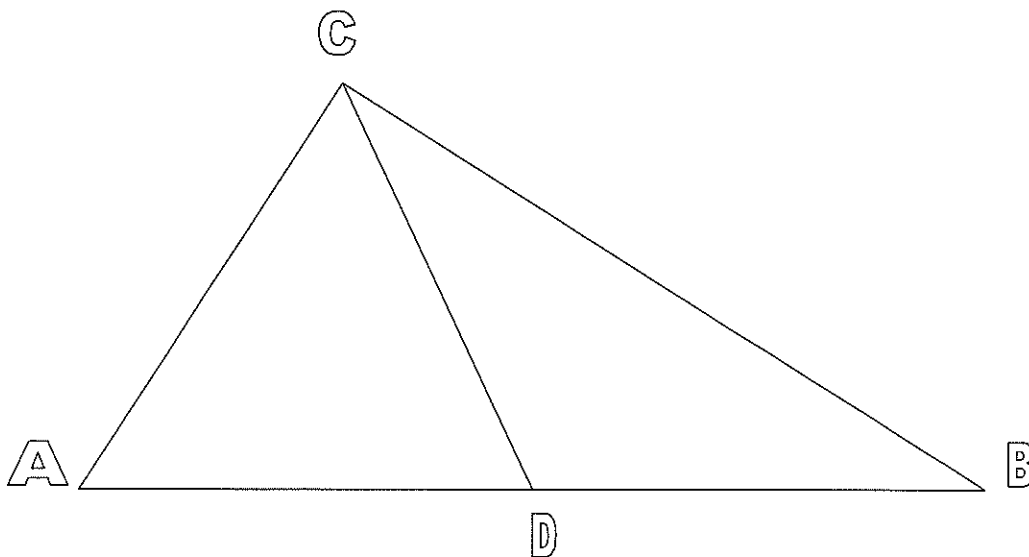
F. x^{3y+4}	G. x^{4y+4}	H. x^{3y-2}	J. x^{4y-2}	K. x^{4y+1}
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27.) The pie graph below represents the relative sizes of a family's per-dollar budget. What is the degree measure of the central angle of the sectors labeled "Food" and "Housing"?



A. 180	B. 188	C. 195	D. 198	E. 208
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28.) In the figure below $AB=BC$, $CD=BD$, and angle $CAD=70$ degrees. Therefore, what is the measure of angle ADC ?



F. 80	G. 70	H. 60	J. 50	K. 40
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29.) What is the slope of a line that passes through the points (-2,3) and (3,-2)?

A. -2	B. -1	C. 0	D. 1	E. 2
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30.) Three angles of a pentagon are 130degrees, 90degrees, and 80degrees. Of the remaining two angles, one is 30degrees more than twice the other. What is the sum of the smallest two angles?

F. 140	G. 150	H. 160	J. 170	K. 180
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31.) How much 20% solution must be added to a 60% solution to give 40 liters of a 50% solution?

A. 32liters	B. 30liters	C. 20liters	D. 10liters	E. 8liters
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32.) How many times does the equation $y = x^4 - x^5$ intersect the x-axis?

F. 1	G. 2	H. 3	J. 4	K. 5
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33.) Bryan is standing 200 feet from objects A and C. The observed angle between the objects is 48 degrees. How far apart are objects A and C?

A. $400\sin 24$	B. $2000\sin 48$	C. $4000\sin 48$	D. $2000\sin 24$	E. $2000\cos 48$
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34.) The current in a river is 4mph. A boat can travel 20mph in still water. How far up the river can the boat travel if the round trip is to take 10 hours?

F. 88miles	G. 96 miles	H. 100 miles	J. 112 miles	K. 124 miles
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35.) A man walks from B to C, a distance of x miles, at 8 miles per hour and returns at 12 miles per hour. What is his average speed?

A. 10.2mph	B. 10mph	C. 9.8mph	D. 9.6mph	E. 9mph
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36.) $\frac{x}{x-y} - \frac{y}{y-x} = ?$

F. $(x+y)/(x-y)$	G. 1	H. $(x-y)/(x+y)$	J. 0	K. x-y
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37.) Given rectangle ABCD with diagonal AC, if AB=12 and BC=9, what is the ratio of the perimeter of rectangle ABCD to the perimeter of triangle ACD?

A. 2:1	B. 6:7	C. 1:2	D. 7:5	E. 7:6
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38.) In the binary operation $\phi, x\phi y$ is defined as $x^2 + y^2$. Which of the following must be true for all values of x and y?

F. $y\phi x = x\phi y$	G. $x\phi y = y\phi y$	H. $x\phi x = x^2$	J. $y\phi y = 2y^2$	K. Two of these
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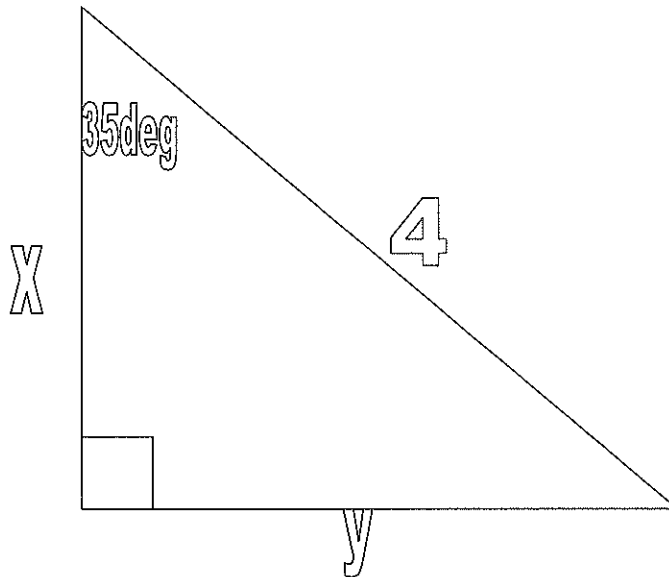
39.) If $f(x) = x^2 - 2$ and $g(x) = 2x + 2$, then $f\{g[f(1/2)]\} = ?$

A. $\frac{1}{4}$	B. $\frac{1}{2}$	C. 1	D. 2	E. 4
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40.) What is the equation of the line that passes through the point (1,1) and is perpendicular to the line with equation $y = (-1/2)x + 3$?

F. $y = (-1/2)x - 2$	G. $y = (-1/2)x + 3/2$	H. $y = 2x + 6$	J. $y = 2x - 1$	K. None of these
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41.) What is the area of the triangle in the figure below?



A. $8\sin 35\cos 35$	B. $8\tan 35$	C. $8/\tan 35$	D. $4\sin 35 + 4\cos 35$	E. $8(\tan 35 + 1)$
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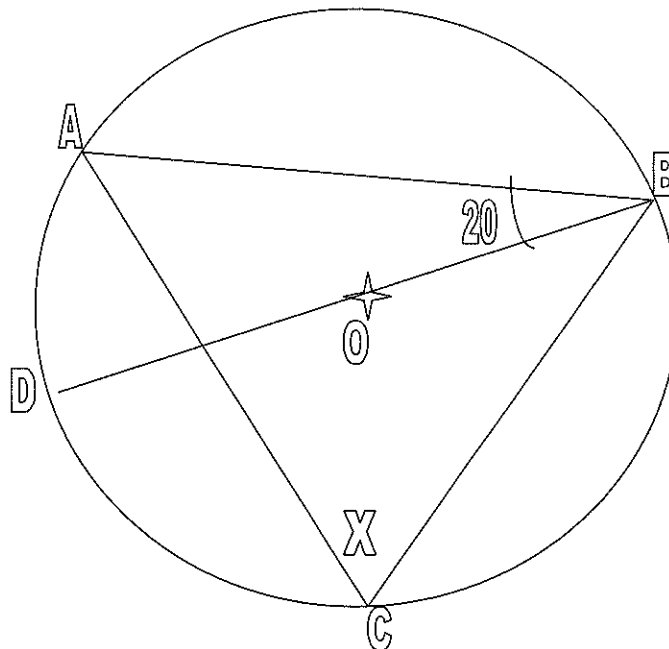
42.) What is the equation of the line with slope $\frac{1}{2}$ that passes through the point $(1, 2)$?

F. $x - 2y + 3 = 0$	G. $2x - y = 0$	H. $x + 2y - 5 = 0$	J. $2x + y - 4 = 0$	K. $4x - y - 2 = 0$
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43.) The length of a rectangle is 6cm greater than its width. The area of the rectangle is 18. What is the width of the rectangle?

A. $3(\sqrt{3} - 1)$	B. $3(\sqrt{3} + 1)$	C. $3(1 - \sqrt{3})$	D. $3\sqrt{3} - 1$	E. $3\sqrt{3} + 1$
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44.) Given circle O, what is the measure of angle x ?



F. 40degrees	G. 55deg	H. 70deg	J. 80deg	K. cannot be determined
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45.) Dave biked 20 miles. If he had increased his average speed by 4mph, the trip would have taken 1 hour less. What is his average speed?

A. $2\sqrt{21}+2$	B. $2\sqrt{21}-2$	C. $2\sqrt{21}-1$	D. $2\sqrt{21}+1$	E. $\sqrt{21}-2$
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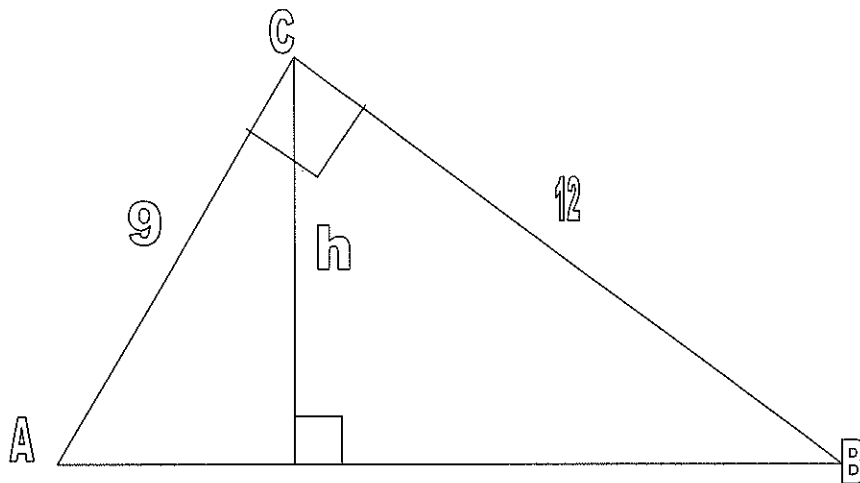
46.) The sum of two numbers is 25. The sum of their squares is 313. What is the value of the larger number?

F. 10	G. 11	H. 12	J. 13	K. 14
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47.) If a line passes through the points (6,4) and (-2,-4), what is its y-intercept?

A. 1	B. 0	C. -1	D. -2	E. -3
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48.) In triangle ABC below, BC=12, AC=9, and angle ACB =90degrees. What is the length of the height from C to line AB?



F. 5.4	G. 6.4	H. 6.8	J. 7.2	K. 8
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49.) Machine A can do a job alone in 10 hours. Machine B can do the same job alone in 12 hours. Machine A is turned on at 6am. Machine B is turned on at 9am. Machine A breaks down at 10am and Machine B must finish the job alone. When will Machine B finish?

A. 2:30	B. 3:42	C. 4:12	D. 4:40	E. cannot be determined
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50.) The total resistance, R, of two resistors, A and B, connected in parallel is given by the formula $\frac{1}{R} = \frac{1}{A} + \frac{1}{B}$. If A=10 and R=4, what is the value of B?

F. $7\frac{1}{4}$	G. 7	H. $6\frac{3}{4}$	J. $6\frac{2}{3}$	K. 6
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Answer Key

1. B	39. A
2. H	40. J
3. C	41. A
4. K	42. F
5. B	43. A
6. G	44. H
7. C	45. B
8. H	46. J
9. B	47. D
10. F	48. J
11. A	49. C
12. J	50. J
13. E	
14. F	
15. A	
16. H	
17. B	
18. K	
19. B	
20. K	
21. D	
22. K	
23. C	
24. J	
25. C	
26. G	
27. D	
28. F	
29. B	
30. G	
31. D	
32. G	
33. A	
34. G	
35. D	
36. F	
37. E	
38. K	

ACT Practice Test

Math #2

1.) If 20% of a class averages 80% on a test, 50% of the class averages 60% on the test, and the remainder of the class averages 40% on the test, what is the overall class average?

A. 64	B. 60	C. 58	D. 56	E. 54
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2.) A full container holds $\frac{5}{8}$ gallon of liquid. If the container is $\frac{4}{5}$ full and then 25% of the liquid is lost due to evaporation, how much liquid is left in the container?

F. $\frac{1}{4}$ gallon	G. $\frac{3}{8}$ gallon	H. $\frac{1}{2}$ gallon	J. $\frac{5}{8}$ gallon	K. $\frac{3}{4}$ gallon
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3.) Two similar polygons have perimeters in the ratio of 3 to 4. If the smaller has an area of 36, what is the area of the larger?

A. $20\frac{1}{4}$	B. 27	C. 48	D. 64	E. 72
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4.) If $f(x) = 2x + 4$ and $g(x) = x^2 - 2$, then $f[g(3)] =$

F. 12	G. 14	H. 18	J. 70	K. 98
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5.) Which of the following is not equal to 123_{five} ?

A. 38_{ten}	B. 100110_{two}	C. 46_{eight}	D. $26_{sixteen}$	E. 1101_{three}
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6.) In 6 years, Tony will be twice as old as he was 4 years ago. How old will Tony be in 4 years?

F. 12	G. 14	H. 16	J. 18	K. 20
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7.) The chart below represents an inventory of the number of toys in the storeroom of Acme Toy Company. If a child were to choose one of these toys at random, what would be the probability that the chosen toy is worth under \$5.00?

NUMBER OF TOYS	VALUE EACH
140	\$3.98
60	4.98
178	5.98
122	6.98
500 TOTAL	

A. $\frac{3}{25}$	B. $\frac{7}{25}$	C. $\frac{2}{5}$	D. $\frac{1}{2}$	E. $\frac{3}{5}$
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8.) Tom's collection of 50 coins consists of dimes and quarters totaling \$7.10. How many more dimes than quarters does Tom have?

F. 14	G. 20	H. 22	J. 26	K. 36
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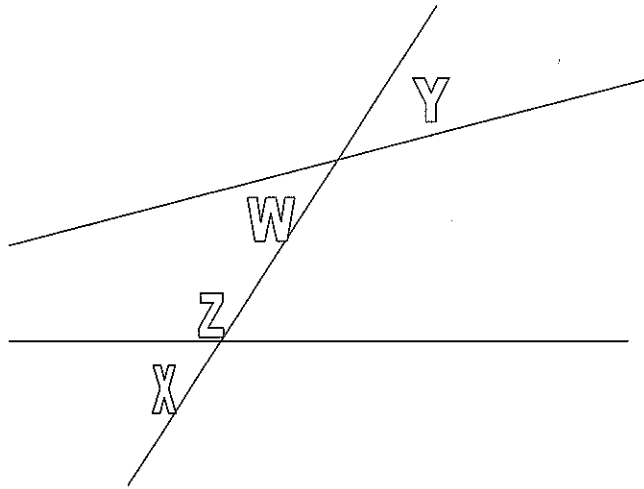
9.) Evaluate $3 + \frac{3}{3 + \frac{3}{3 + \frac{3}{3 + 3}}}$

A. $3\frac{23}{27}$	B. $3\frac{7}{9}$	C. $3\frac{19}{27}$	D. $3\frac{17}{27}$	E. $3\frac{1}{3}$
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10.) I have enough to buy 45 bricks. If the bricks each cost 10 cents less, I could buy 5 more bricks. How much money do I have to spend on bricks?

F. \$100	G. \$50	H. \$45	J. \$40	K. \$35
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11.) In the figure below, $\angle W + \angle Z = 170^\circ$. Which of the following is (are) true?



I. $\angle X > \angle Y$

II. $\angle X$ and $\angle Z$ are supplementary

III. $\angle X < 90^\circ$

A. I only	B. I and II only	C. I and III only	D. II and III only	E. I, II, and III
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12.) An empty fuel tank is filled with brand Z gasoline. When the tank is half empty, it is filled with brand Y gasoline. When the tank is half empty again, it is filled with brand Z gasoline. When the tank is half empty again, it is filled with brand Y gasoline. At this time, what percent of the gasoline in the tank is brand Z?

F. 50%	G. 40%	H. 33 1/3 %	J. 25%	K. None of these
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13.) Pete has some apples. He sold 40% more than he ate. If he sold 70 apples, how many did he eat?

A. 90	B. 50	C. 42	D. 40	E. 28
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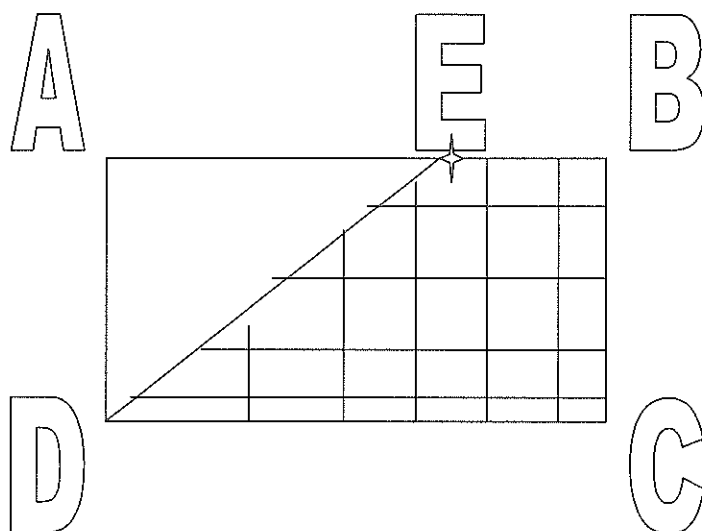
14.)
$$\frac{(4^{2x})(4^x)(2^{4x})}{(2^{6x})(4^{3x})(2^{2x})}$$

F. 2^{4x}	G. 4^{2x}	H. $1/4^{2x}$	J. $1/2^{2x}$	K. $1/4^x$
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15.) How many 3-person committees can be formed in a club with 8 members?

A. 8	B. 24	C. 48	D. 56	E. 336
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16.) In rectangle ABCD below, $BC=4$, $CD=10$, and $BE=x$. What is the area of the shaded region?



F. $20+2x$	G. $20+4x$	H. $40-x/2$	J. $20+x$	K. $40+2x$
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17.) At a party there were 5 times as many females as males. There were 3 times as many adults as children. Which of the following could not be the number of people at the party?

A. 72	B. 120	C. 216	D. 258	E. 384
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18.) Which of the following is the largest?

F. half of 30% of 280	G. One third of 70% of 160	H. Twice 50% of 30	J. Three times 40% of 40	K. 60% of 60
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19.)
$$\frac{12\sqrt{6} - 6\sqrt{50}}{\sqrt{72}}$$

A. 2	B. $(\sqrt{3} - \sqrt{2})/2$	C. $3\sqrt{2} - 6\sqrt{3}$	D. $2\sqrt{3} - 5$	E. None of these
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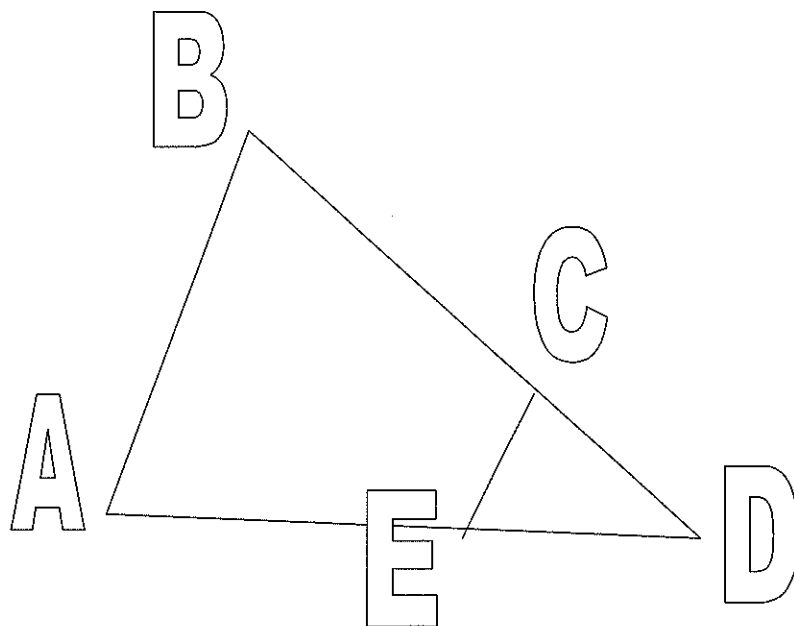
20.) If electricity costs x cents per kilowatt hour for the first 30 kilowatt hours and y cents per kilowatt hour for each additional kilowatt hour, what is the cost of z kilowatt hours ($z > 30$)?

F. $30(x-y)+yz$	G. $(z-30)x+30y$	H. $30y-30x+yz$	J. $30+(y-30)z$	K. $30(x+y)-yz$
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21.) What is the point of intersection of the two lines with the following equations:
 $3y+2x=18$ and $y=4x-8$?

A. (8,-3)	B. (4,3)	C. (3,4)	D. (2,0)	E. (-3,8)
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22.) In the figure below $AB \parallel CE$, $AE=12$, $DE=6$, and $CE=4$. What is the length of AB ?



F. 6	G. 8	H. 10	J. 12	K. 18
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23.) Using 3 standard dice, what is the approximate probability of rolling a combination totaling 4?

A. 1/18	B. 1/36	C. 1/64	D. 1/72	E. 1/108
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24.) The sum of twice the complement and 3 times the supplement of an angle is 400 degrees. Find the angle.

F. 34	G. 44	H. 54	J. 64	K. 74
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25.) If $6x-3y=30$ and $4x=2-y$, then what is the value of $x+y$?

A. -8	B. -6	C. -4	D. 2	E. 8
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26.) If a 32 inch chord is drawn in a circle of radius 20 inches, how far is the chord from the center of the circle?

F. 4inches	G. 6 inches	H. 8inches	J. 10inches	K. 12 inches
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27.) If $7x=3y$, what is the ratio of x to y ?

A. 7/3	B. 7/4	C. 4/3	D. 4/7	E. 3/7
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28.) If $\frac{3}{y} + \frac{4}{2y} = \frac{3}{4}$, what is the value of y ?

F. 8	G. $6\frac{2}{3}$	H. $4\frac{1}{2}$	J. $2\frac{3}{4}$	K. $1\frac{1}{3}$
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29.) What are the coordinates of one endpoint of a segment if the other endpoint has coordinates (x,y) and the midpoint has coordinates $(3x,-3y)$?

A. $(2x,-y)$	B. $(-2x,y)$	C. $(5x,-7y)$	D. $(4x,-2y)$	E. $(7x,-5y)$
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30.) Tim's weight is 12kg more than twice Jane's weight. What is Tim's weight if they weight 135kg together?

F. 94kg	G. 82kg	H. 73.5kg	J. 61.5kg	K. 41kg
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31.) If $i = \sqrt{-1}$, simplify $\frac{1}{3+i}$

A. $\frac{3-i}{10}$	B. $\frac{i-3}{10}$	C. $\frac{3-i}{8}$	D. $\frac{i-3}{8}$	E. $\frac{1}{3i}$
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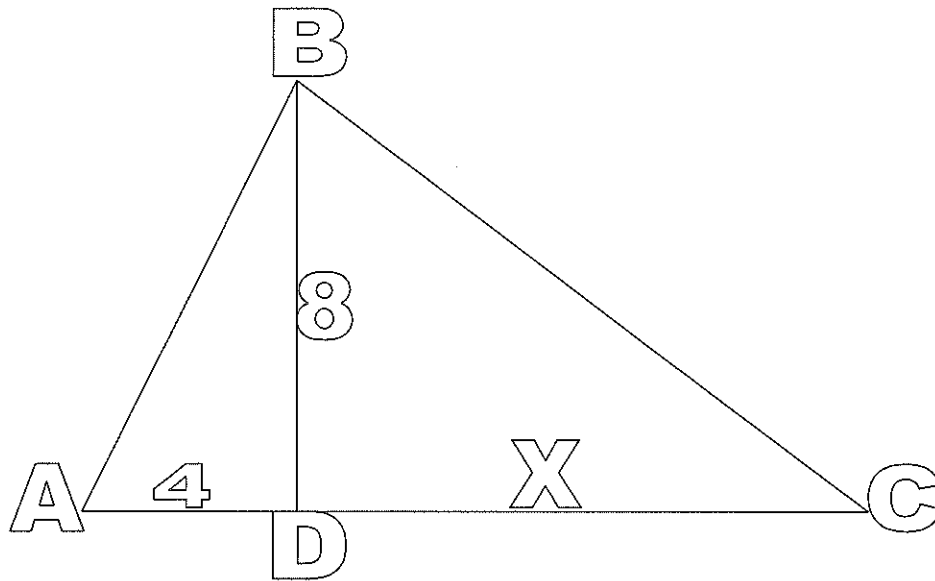
32.) Find the product of $(5x^2y)$, $(-2xy^2)$, $(-3y^4)$

F. $30x^2y^8$	G. $-30x^3y^7$	H. $30x^3y^7$	J. $-30x^2y^8$	K. $60x^3y^7$
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33.) Mike is twice as old as Sue. If Mike were 4 years younger and Sue were 3 years older, their ages would differ by 12 years. What is the sum of their ages?

A. 19	B. 38	C. 42	D. 56	E. 57
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34.) In the figure below, $AB \perp BC$, $BD \perp AC$ and each triangle is scalene. What is the length of AC?

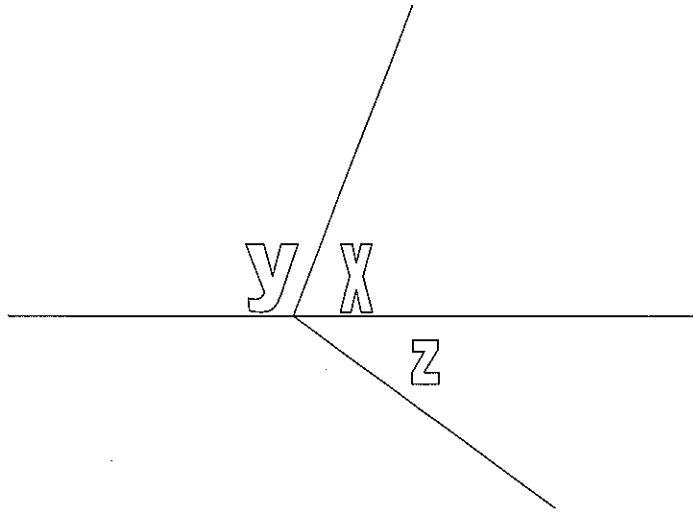


F. 12	G. 16	H. 20	J. 32	K. Cannot be determined
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35.) If 6 apples and 2 pears weight the same as 3 apples and 6 pears, how many apples will it take to balance 12 pears?

A. 3	B. 5	C. 6	D. 9	E. 12
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36.) In the figure below, angle x and angle z are complementary. In terms of angle y, what is the measure of angle z?



F. $y-90$	G. $180-y$	H. $90+y$	J. $y+180$	K. $90-y$
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37.) What is the approximate value of $\sqrt{2491/103}$?

A. 50	B. 25	C. 24	D. 5	E. 4
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38.) $1-2+3-4+5-\dots+99=?$

F. 100	G. 50	H. 0	J. -50	K. -100
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39.) A student received the following scores on five exams: 32, 20, 40, 42, 36. Which of the following scores would the student need to receive on the sixth test so that the median score and the mean score would be the same?

A. 46	B. 48	C. 52	D. 58	E. 60
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40.) Three consecutive odd numbers add up to 15 more than twice the smallest. What is the sum of the three numbers?

F. 33	G. 31	H. 29	J. 28	K. 26
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Answer Key

1. C	2. G	3. D	4. H	5. E
6. J	7. C	8. H	9. B	10. H
11. B	12. K	13. B	14. H	15. D
16. F	17. D	18. J	19. D	20. F
21. C	22. J	23. D	24. J	25. C
26. K	27. E	28. G	29. C	30. F
31. A	32. H	33. E	34. H	35. D
36. F	37. D	38. G	39. D	40. F