ACT Test Breakdown – Math

60 math questions in 60 minutes

Pre-Algebra	23%
Elementary Algebra	13%
Intermediate Algebra	15%
Coordinate Geometry	15%
Plane Geometry	23%
Trigonometry	7%

Tips/Strategies for Math

- Try to do the easy questions in 5-10 seconds; that will free up some time for the harder problems.
- Circle important numbers and information as you are reading; draw and mark diagrams whenever possible.
- Don't be afraid to show work. It will help you focus on the task.
    - Solving algebraically is more efficient (time saving) than trying to guess.
- The questions start easier and get progressively more difficult.
- Do the ones that you know how to do first and focus on getting those correct. Go back and do the other ones at the end and if you can't figure it out give your best guess.
- Even though the diagrams say they are not to scale, they are. Estimate!
- Try to do the problems without looking at the answers first. Working backwards from the answers should be a last result.
- One strategy is to pick specific values for the variables to make the questions more concrete and less abstract.
- Always go back and answer the question. Many of the wrong answers are there because they represent a number in a calculation that wasn't carried out until the end.
- Use your graphing calculator to help you. It is helpful for: working with fractions and decimals, determining square root expressions are equivalent, graphing, solving with graphs or tables, putting two expressions in Y= to determine equivalence, etc.
- If you don't know how to solve an equation algebraically, solve with a table or graph.
- Memorize formulas and know basic concepts (distance formula, midpoint formula, Quadratic Formula, Pythagorean Theorem, Pythagorean Triples, area formulas, volume formulas, special right triangles, right triangle trigonometry)
- If you have time, go back and check your work.
- Do the practice test at home timing yourself.

Prealgebra Reminders for the ACT

Mean (aka "average"), Median, and Mode

Average = $\frac{sum\ of\ values}{number\ of\ values}$ Sometimes you are given the average and need to find one of the values. Write an equation and use algebra!	Median – the middle value (*after you put the numbers in order!*)	Mode – the most common value

Probability and Counting

Probability of an event = $\frac{number\ of\ success}{total\ number}$	If one operation can be done in ***a*** ways and a second can be done in ***b*** ways, then the number of ways to do the first operation followed by the second is the product ***ab***.

Percents

Remember to change percents to their decimal equivalents when computing (ex: 8.25% = .0825)
Translate the question to an equation and solve. *a number = percent * whole*
If you are adding a percent to the whole then multiply by (1 + percent).
If you are subtracting a percent from the whole then multiply by (1 – percent).

Finding the number	Finding the whole	Finding the percent
An item is $3 now. If it goes on sale for 20% off, what is the sale price? *number* = (1 – 0.20)*3	An item has a tax of 8% off and the total price is $6.48. What is the regular price? 6.48 = (1 + 0.08)**whole*	A sales rep has a sales goal of 40 items. He sells 52 instead. The actual sales represent what percent of the goal? 52 = *percent* * 40

Factors, GCFs, LCMs, LCDs, and Primes

Factors of 8: 1, 2, 4, 8 Factors of 12: 1, 2, 3, 4, 6, 12	Common factors are 1, 2, 4 The greatest common factor is 4.	A number that has only factors of 1 and itself is prime. 0 and 1 are not considered prime. All other numbers that are not prime are composite.
Multiples of 8: 8, 16, 24, 32, 48… Multiples of 12: 12, 24, 36, 48…	Common multiples are 24, 48, … The least common multiple is 24.	

We use the least common multiple when deciding what common denominator to use in order to add or subtract fractions. Thus, the least common denominator is the least common multiple of the denominators.

Miscellaneous

- Distance = rate* time
- Recognize proportional situations and set up proportions to find the missing value. An example is a question about how many degrees to use for a particular category when creating a circle graph. Remember that there are 360° in a circle.
- You may see things that you have never seen before—sometimes that is the idea!
  An example would be a question that begins "a □ b = 2 + a + b – ab". You will need to either substitute values using the rule given or generalize about the results of the rule.

Calculator Tips

Use parentheses around negative numbers and numerators and denominators.
When you are using your calculator with a mixed number such as $2\frac{5}{8}$, enter as (2 + 5/8).
You can enter numbers in scientific notation as you see them as long as you put them in parentheses prior to calculating.

Prealgebra Practice for the ACT

1. What is the least common denominator when adding the fractions $\frac{f}{3}, \frac{g}{4}, \frac{h}{8}$, and $\frac{j}{12}$?

A. 24
B. 48
C. 64
D. 96
E. 288

2. Kareem has 4 sweaters, 6 shirts, and 3 pairs of slacks. How many distinct outfits, each consisting of a sweater, shirt, and a pair of slacks, can Kareem select.

A. 13
B. 36
C. 42
D. 72
E. 216

$4 \cdot 6 \cdot 3$

3. If p is a factor of both 45 and 60, but not a factor of 9 nor 10, what should you get when you add the digits in p?

A. 3
B. 2
C. 5
D. 6
E. 9

45
1, 3, 5, 9, 15, 45

$1+5=6$

60
1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

4. An oil tank contains 4,800 gallons of oil. Each gallon of oil weighs approximately 6 pounds. About how many pounds does the oil in the tank weigh?

A. 800
B. 4,806
C. 6,000
D. 28,800
E. 46,800

gal / pounds

$\frac{4800}{x} = \frac{1}{6}$

5. John has taken 5 of the 6 equally weighted tests in his U. S. History class this semester and has earned the following scores: 90, 82, 60, 75, 83. How many points does he need to earn on the 6th test to bring his average score up to exactly 80.0 points?

A. 90
B. 88
C. 82
D. 80
E. 78

$80 = \frac{90+82+60+75+83+x}{6}$

6. A carton of 12 cans of soda is priced at $6.60 now. If the soda goes on sale for 20% off the current price, what will be the price of the carton?

A. $0.55
B. $1.32
C. $5.28
D. $6.36
E. $6.40

$6.60(.80)$

7. If 75% of a number is 180, then what is 10% of the number?

A. 2.4
B. 13.5
C. 24
D. 45
E. 240

$\frac{.75(x)}{.75} = \frac{180}{.75}$

$x = 240$

$.10(240) = 24$

8. On Monday a skirt was priced at $60.00. On Wednesday, the price was reduced by 15%. Two weeks later, the price was further reduced by 20%. What percent of the original price is this last price?

A. 35%
B. 40%
C. 51%
D. 65%
E. 68%

$60(.85) = 51$

$51(.80) = 40.8$

$\frac{40.8}{60} =$

Algebra Practice for the ACT

1. Which of the following is (are) equivalent to the mathematical operation $a(b + c)$ for all real numbers a, b, and c?

I. $ca + ba$
II. $ab + ac$
III. $(b + c)a$

A. I only
B. II only
C. III only
D. I and II only
E. I, II and III

2. Carrie has \$7 less than does her brother, Steve, who has d dollars. Carrie does not spend any money and earns \$3. Which of the following is an expression for the amount of money, in dollars, that Carrie has?

A. $(d - 7) + 2$
B. $d + 4$
C. $d - (7 + 3)$
D. $d - 4$
E. $d - 7$

$d - 7 + 3$

3. In the standard (x,y) coordinate plane, what is the slope of a line containing the points (3, -8) and (4, 7)?

A. $-\frac{1}{15}$
B. -1
C. $\frac{3}{7}$
D. 7
E. 15

$\frac{7 - -8}{4 - 3}$

4. If $q = 1$ and $s = 3$, what is the value of the expression $\frac{(q-s)}{3q}$?

F. -1
G. $-\frac{2}{3}$
H. $\frac{2}{3}$
I. $\frac{4}{3}$
J. 4

$\frac{1-3}{3}$

5. What is the value of the expression $(x - y)^2$ when x = 5 and y = -1?

$(5 - -1)^2$

A. 4
B. 6
C. 16
D. 24
E. 36

6. If $0.4x + 2.2 = x - 2$, then x = ?

A. 3
B. 6
C. 7
D. 10
E. 14

$.4x + 2.2 = x - 2$
$-2.2 \quad -2.2$
$.4x = x - 4.2$
$-x \quad -x$
$-.6x = -4.2$

7. If $12x = -8(10 - x)$, then x = ?

F. 20
G. 8
H. $7\frac{3}{11}$
J. $6\frac{2}{13}$
K. -20

$12x = -80 + 8x$
$-8x \quad -8x$
$\frac{4x}{4} = \frac{-20}{4}$

8. The value of x that will make $\frac{x}{2} + 1 = \frac{3}{4}$ a true statement lies between which of the following numbers?

A. -3 and -1
B. -1 and 0
C. 0 and 1
D. 1 and 3
E. 3 and 5

$\frac{x}{2} = \frac{3}{4} - 1$
$\frac{x}{2} = -\frac{1}{4}$
$4x = -2$
$x = -\frac{1}{2}$

9. What is the y-intercept of the line in the standard (x, y) coordinate plane that goes through the points (-3, 6) and (3, 2)?

A. 0
B. 2
C. 4
D. 6
E. 8

$m = -2/3$
$6 = -2/3(3) + b$
$4 = b$

10. The point (2, 5) is shown in the standard (x, y) coordinate plane. Which of the following is another point on the line through the point (2, 5) with a slope of $-\frac{2}{3}$?

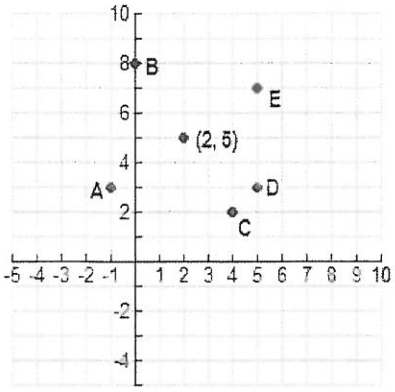
A. (-1, 3)

B. B (0, 8)

C. C (4, 2)

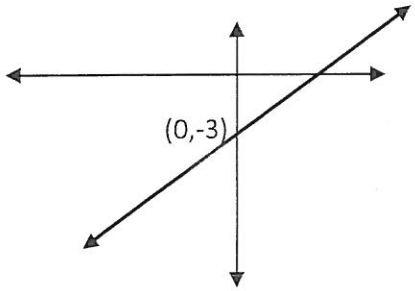
D. D (5, 3)

E. E (5, 7)



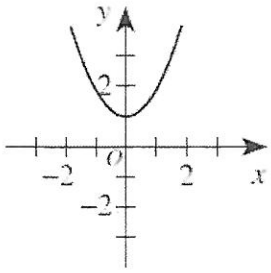
11. If a system of 2 linear equations in 2 variables has NO solution, and 1 of the equations is graphed in the (x,y) coordinate plane below, which of the following could be the equation of the other line?

A. y = -2
B. y = -4x + 2
C. y = -2x – 3
D. y = 4x + 2
E. y = 4x – 3

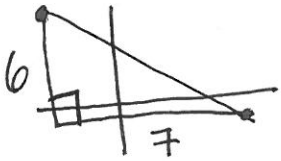


12. The figure most closely resembles the graph of which of the following functions?

A. $-x^2 + 1$
B. $x^2 + 1$
C. $x^2 - 1$
D. $2x^2$
E. $x^2 - 1$



13. What is the distance, in coordinate units, between the points (-3, 5) and (4, -1) in the standard (x, y) coordinate plane?



A. $\sqrt{13}$
B. $\sqrt{17}$
C. $\sqrt{85}$
D. 13
E. 85

Try this matrix problem...

14. The number of students participating in fall sports at a certain high school can be shown by the following matrix.

Tennis	Soccer	Cross Country	Football
[40	60	80	80]

The athletic director estimates the ratio of the number of sports awards that will be earned to the number of students participating with the following matrix.

Tennis	0.3
Soccer	0.4
Cross Country	0.2
Football	0.5

Given these matrices, what is the athletic director's estimate for the number of sports awards that will be earned for these fall sports?

A. 80
B. 88
C. 91
D. 92
E. 99

$.3(40) + .4(60) + .2(80) + .5(80) =$