PRE-CALC & TRIG

Day 62

ACT DAY 2

- ACT Prep Guidelines
- Math Mini Test 1
- Go Over Mini Test
- Mini Test 2 (in class/take home)

How many questions are on the math test?

TOTAL OF 60 questions,
60 minutes

Pre-algebra 14

Elementary algebra 10

Intermediate algebra 9

Coordinate geometry 9
Plane geometry 14
Trigonometry 4

These 6 sections are split into 3 sub scores

- ■ Pre-Algebra and Elementary Algebra
- ■ Intermediate Algebra and Coordinate Geometry
- ■ Plane Geometry and Trigonometry

You'll be able to identify how many of each sub category you got correct, and therefore know which areas need more attention

Pre-Algebra (20-25%)

- Basic operations using whole numbers, decimals, fractions, and integers

- Place value

- Square roots and approximations

- The concept of exponents

- Scientific notation

- Factors

Ratio, proportion, and percent

Linear equations in one variable

Absolute value and ordering numbers by value

Elementary counting techniques and simple probability

Data collection, representation, and interpretation

Understanding simple descriptive statistics

13. For 2 consecutive integers, the result of adding the smaller integer and triple the larger integer is 79. What are the 2 integers?

A. 18, 19
B. 19, 20
C. 20, 21
D. 26, 27
E. 39, 40

43. The circle graph below shows the distribution of registered voters, by age, for a community. Registered voters are randomly selected from this distribution to be called for jury duty. What are the odds (in the age range:not in the age range) that the first person called for jury duty is in the age range of 25–35 years?

Distribution of Registered Voters by Age

11%   8%

25%

42%

14%

- 18–24
- 25–35
- 36–44
- 45–55
- 56 and up
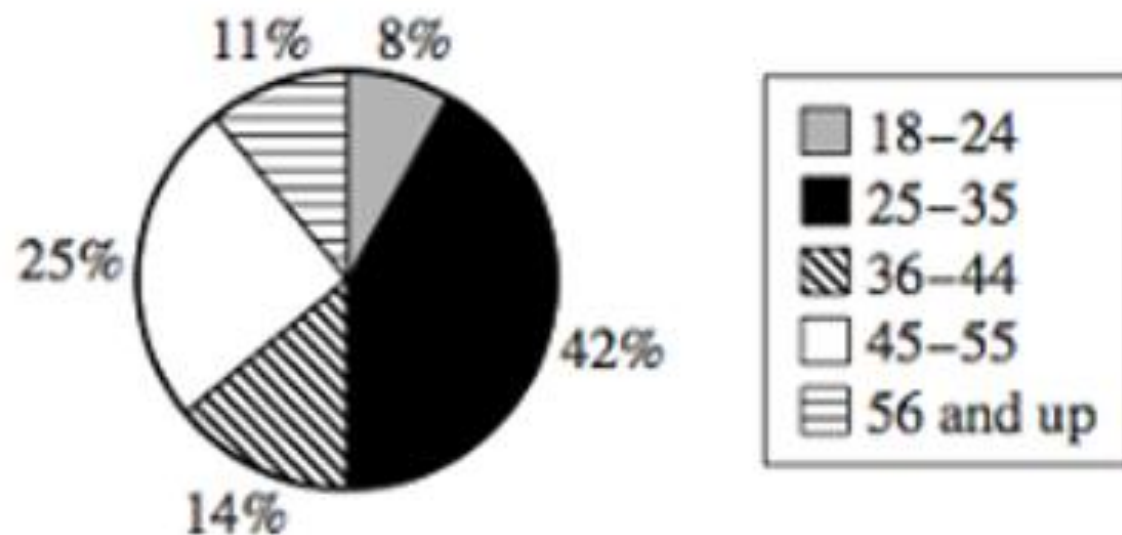
A.   1:3
B.   7:8
C.   7:43
D. 21:29
E. 42:25

Elementary Algebra (15-20%)

- Properties of exponents and square roots
- Evaluation of algebraic expressions through substitution
- Using variables to express functional relationships
- Understanding algebraic operations
- The solution of quadratic equations by factoring

1. The weekly fee for staying at the Pleasant Lake Campground is $20 per vehicle and $10 per person. Last year, weekly fees were paid for v vehicles and p persons. Which of the following expressions gives the total amount, in dollars, collected for weekly fees last year?

A. $20v + 10p$
B. $20p + 10v$
C. $10(v + p)$
D. $30(v + p)$
E. $10(v + p) + 20p$

2. If $r = 9$, $b = 5$, and $g = -6$, what does $(r + b - g)(b + g)$ equal?

F. −20
G. −8
H. 8
J. 19
K. 20

Intermediate Algebra (15-20%)

- The quadratic formula
- Rational and radical expressions
- Absolute value equations and inequalities
- Sequences and patterns
- Systems of equations

Quadratic inequalities

Functions and modeling

Matrices

Roots of polynomials

Complex numbers

53. The *determinant* of a matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ equals $ad - cb$.

What must be the value of x for the matrix $\begin{bmatrix} x & 8 \\ x & x \end{bmatrix}$ to have a determinant of -16 ?

A. -4

B. -2

C. $-\dfrac{8}{5}$

D. $\dfrac{8}{3}$

E. 4

60. The solution set of which of the following equations is the set of real numbers that are 5 units from −3 ?

F. $|x + 3| = 5$

G. $|x - 3| = 5$

H. $|x + 5| = 3$

J. $|x - 5| = 3$

K. $|x + 5| = 3$

Coordinate Geometry (15-20%)

- Graphing and the relations between equations and graphs, including points, lines, polynomials, circles, and other curves

- Graphing inequalities

- Slope

- Parallel and perpendicular lines

- Distance

- Midpoints

- Conics

39. The coordinates of the endpoints of $\overline{CD}$, in the standard (x,y) coordinate plane, are $(-4,-2)$ and $(14,2)$. What is the x-coordinate of the midpoint of $\overline{CD}$?

A.   0
B.   2
C.   5
D.   9
E. 10

Plane Geometry (20-25%)

- Properties and relations of plane figures, including angles and relations among perpendicular and parallel lines

- Properties of circles, triangles, rectangles, parallelograms, and trapezoids

- Transformations

- The concept of proof and proof techniques

- Volume

- Applications of geometry to three dimensions

38. In the figure below, points E and F are the midpoints of sides $\overline{AD}$ and $\overline{BC}$ of rectangle $ABCD$, point G is the intersection of $\overline{AF}$ and $\overline{BE}$, and point H is the intersection of $\overline{CE}$ and $\overline{DF}$. The interior of $ABCD$ except for the interior of $EGFH$ is shaded. What is the ratio of the area of $EGFH$ to the area of the shaded region?
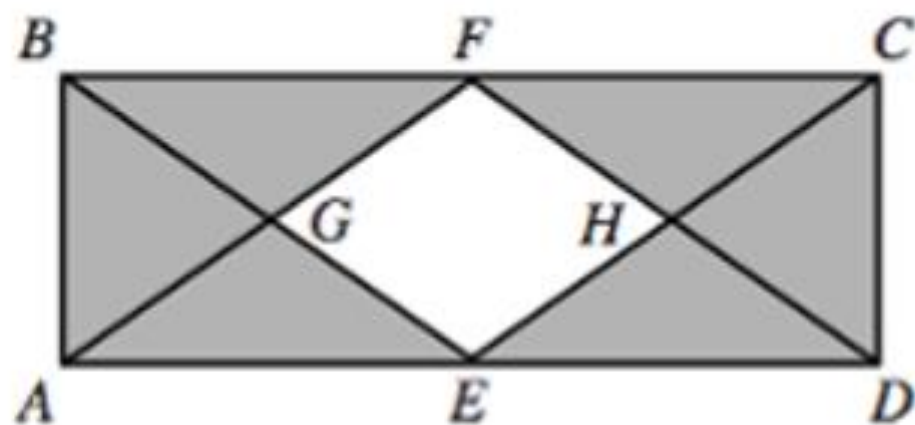
F. 1:2
G. 1:3
H. 1:4
J. 1:6
K. Cannot be determined from the given information

Trigonometry (5-10%)

- Trigonometric relations in right triangles
- Values and properties of trigonometric functions
- Graphing trigonometric functions
- Modeling using trigonometric functions
- Use of trigonometric identities
- Solving trigonometric equations

42. According to the measurements given in the figure below, which of the following expressions gives the distance, in miles, from the boat to the dock?
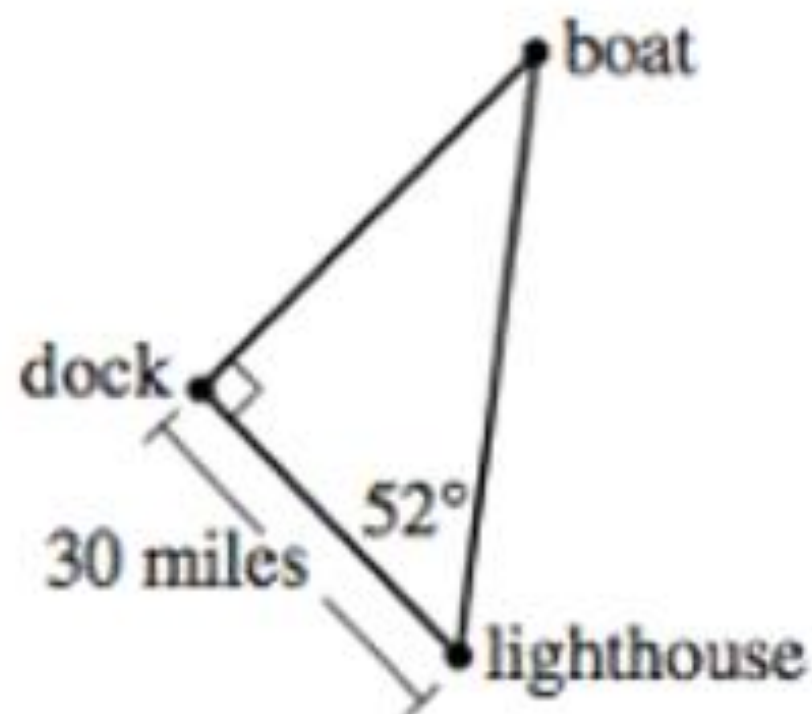
F. 30 tan 52°

G. 30 cos 52°

H. 30 sin 52°

J. $\dfrac{30}{\cos 52^\circ}$

K. $\dfrac{30}{\sin 52^\circ}$

Never score below 20 again...

English

You should be above 20. Just master your Grammar Rules, and practice with English passages. How?

Hammer: 1 passage - 9 minutes - review - repeat.

Math

Don't worry about the last ten questions. Just get 2/3rds of the first 50 right, and single-bubble the final ten questions. How?

Hammer: 3 questions - 3 minutes - review - repeat.

Relax and focus - only 50 questions in 60 minutes!

Reading

Don't worry about the last passage. Just get 70% of the first 30 questions right, and single-bubble the final ten. How?

Hammer: 1 passage - 8:45 - review - repeat.

Relax and focus - only 3 passages in 35 minutes!

Science

Don't worry about the last passage. Just get 70% of the questions in the first 6 passages correct, and single-bubble the final passage. How?

Hammer: 1 passage - 5 minutes - review - repeat.

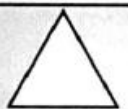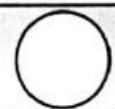Relax and focus - only 6 passages in 35 minutes!

PUDWYK: PUt Down What You Know
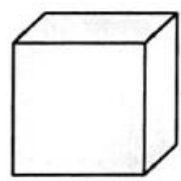
Show your work - formulas first

Then:

- **QUICK-CHECK**: rework each question quickly in your head or with your calculator — make sure it's right!

The JBTP Math Strategy:

1. PUDWYK.
2. **Work clearly** (sloppiness = points).
3. **Quick-Check™** in your head (or with your calculator). Circle & bubble.
4. **Get to all 60!**

Remember:

- **Focus first on the initial 20 questions**; if you miss many you are probably confusing a fundamental geometry formula or algebra technique.

- **Get the first 10 right.**

- A powerful form of PUDWYK: *GOOVGIN.*

	△	▢	◯
Area	$\frac{1}{2}bh$	bh	πr^2
Perimeter/ Circumference	add sides	add sides	$2\pi r$
Degrees	180	360	360

$a^2 + b^2 = c^2$

Perfect right triangles

3-4-5   5-12-13   7-24-25   8-15-17

Volume

$V = lwh$

Exponents

$8^2 \cdot 8^4 = 8^6$

$\dfrac{3}{7^{-4}} = \dfrac{3(7^4)}{1}$
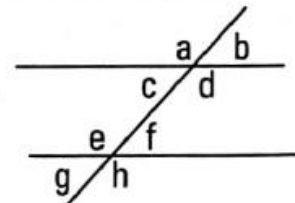
$(8^4)^3 = 8^{12}$

$\dfrac{8^2}{8^5} = 8^{-3} = \dfrac{1}{8^3}$

$8^0 = 1$

$\sqrt[4]{3^5} = 3^{5/4}$

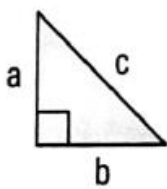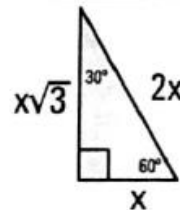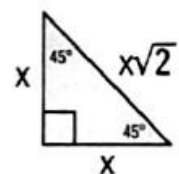**Probability** $= \dfrac{\text{\# of winners}}{\text{total}}$

$4! = 4 \cdot 3 \cdot 2 \cdot 1$

$a + b = 180$
$f + h = 180$
$a = d = e = h$

SOH CAH TOA

$\sin x = \dfrac{\text{opp}}{\text{hyp}} = \dfrac{5}{13}$

$\tan x = \dfrac{\sin x}{\cos x} = \dfrac{\text{opp}}{\text{adj}} = \dfrac{5}{12}$

$\cos x = \dfrac{\text{adj}}{\text{hyp}} = \dfrac{12}{13}$
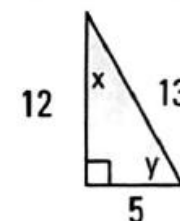
$$\frac{2}{3} + \frac{2}{3} = \frac{4}{3} \qquad \frac{4}{3} \cdot \frac{2}{9} = \frac{8}{27}$$

$$\frac{8}{5} - \frac{1}{2} = \qquad \frac{\frac{3}{2}}{\frac{2}{5}} = \frac{3}{1} \cdot \frac{5}{2} = \frac{15}{2}$$

$$\frac{16}{10} - \frac{5}{10} = \frac{11}{10}$$

$$|-3| = 3$$

Foil
$$(x + 1)(x - 2) = 0$$
$$x^2 - 2x + 1x - 2 = 0$$
$$x^2 - x - 2 = 0$$

Reverse Foil
$$x^2 - 7x + 10 = 0$$
$$(x - 5)(x - 2) = 0$$
$$x = 5 \quad x = 2$$

Distance = (rate)(time)

Regular shaped object
# of degrees =
(# of angles - 2) • 180

Midpoint Formula
$$\frac{x_1 + x_2}{2} , \quad \frac{y_1 + y_2}{2}$$

$$(x+2)^2 = (x+2)(x+2)$$
$$= x^2 + 4x + 4$$

$$y = mx + b \qquad \textbf{Lines}$$

$$m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\triangle y}{\triangle x}$$

b = y intercept

⊥ slope = -reciprocal

Distance Formula
make the distance a hypotenuse & use
$$a^2 + b^2 = c^2$$

Median = middle value

Mode = most recurring value

$$\textbf{Mean} = \frac{\text{sum}}{\text{total \#}} = \text{average}$$

1, 2, 2, 5, 7, 9, 100

Median =   Mode =   Mean =

Circle Formula

center = x_1, y_1

$$(x-x_1)^2 + (y-y_1)^2 = r^2$$

Mini Test 1

- We'll set a timer for 10 minutes.
- Complete as many of the 10 problems as you can.
- Be honest with yourself.

Read the Directions before the Test Day

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

Mini Test 2 (in class/homework)

- We'll set a timer for 10 minutes.
- Complete as many of the 10 problems as you can.
- Be honest with yourself.

Go Over Mini Test 1 and Mini Test 2

■ Common Mistakes

■ Ways we could have eliminated some solutions

■ Formulas used