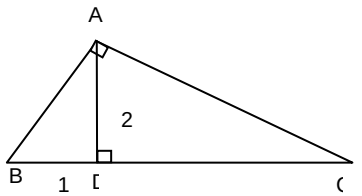
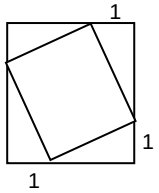
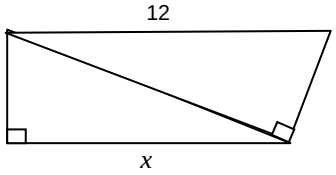
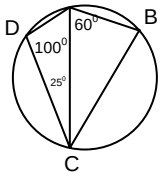
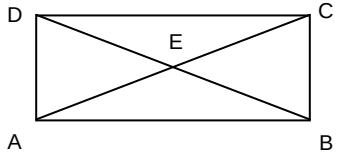
2005

A1 Solve for x: $x^2 - 6x + 9 = (x - 3)^{-1}$	A2 Find the area of an equilateral triangle of side 2.	A3 The points $(a,2a+3)$ and $(4a,5a+6)$ lie on a line of slope 2. Find a.	A4 $\angle BAC = 90^0 = \angle ADB$, BD = 1, and AD = 2. AC = ? 	A5 $x + \frac{1}{x} = 3$ $x^2 + \frac{1}{x^2} = ?$
A6 Evaluate $\sin(20^0) + \sin(340^0)$	A7 Evaluate $\log_{1/8} 8$	A8 How many integers from 10 through 99 have 2 as exactly one digit?	A9 $x^{2/5} y = 3$ $xy^2 = 18$ $x = ?$	A10 Evaluate θ in degrees if $\cos(\theta) + \cos(2\theta) = 0$ and $0^0 < \theta < 90^0$.
A11 The inner square has area 5. Each right triangle has leg 1. Find the area of the outer square. 	A12 Solve for x: $4^{5+x} = 8^x$	A13  x = ?	A14 Jack is twice as old as Jill. Seven years ago, he was three times as old as she was. How old is Jill now?	A15 $a^2 - b^2 = 31$ a and b are positive integers. $a = ?$
A16 Simplify $6\log_8(2^x)$	A17 What is the area of the triangle formed by the y-axis and the lines $y = x + 3$ and $y = 2x - 7$?	A18 $f(x) = 5x + 3$ for all x. Solve for a: $f(f(a)) = 4a$.	A19 Find the volume in cubic inches of a cube with surface area 150 in.^{2}	A20 Find the minimum value of $x^2 + 6x + 2005$ for all real numbers x.

A21 A, B, C, D lie in order on a circle. $\angle ACD = 25^0$, $\angle ADC = 100^0$, and $\angle BAC = 60^0$. $\angle ACB$ = ?  	A22 Simplify $\dfrac{x^9 - x^{-5}}{x^{-6} - x^8}$	A23 If $f^{-1}(x) = \dfrac{2x+1}{3x-2}$ find $f(1)$.	A24 When 3 coins are tossed, what is the probability that exactly 2 are heads?	A25 Evaluate $sec^2(tan^{-1} 3)$.
A26 Find the area of the triangle with vertices (2,1), (0,0), and (1,-2).	A27 Switching the digits of a two-digit number reduces the number by 45. One digit is 3. What is the other?	A28 Solve for *x:* $\lvert x+2\rvert - \lvert x-2\rvert = 2$	A29 Simplify $(x + i)^2 + (x + 1)^2 +$ $(x - i)^2 + (x - 1)^2$ for $i^2 = -1$.	A30 $2005^{x^2+x+1} = 2005^{x^3-1}$ x = ?
A31 ABCD is a rectangle. $\dfrac{area(ABE)}{area(ADE)}$ = ?  	A32 Simplify $\sin\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{4}\right)$.	A33 If $f(x) = x^{2005} + 2005x + 1003$, find $f(2005) + f(-2005)$.	A34 Six points lie on a circle. How many lines contain pairs of the points?	A35 $2log_{10}(x + 1) = log_{10}(x^2 + 4)$ x = ?
A36 Find the greatest distance between two points on the graph of $x^2 - 2x + y^2 = 8$	A37 True or False: $(.75)^{1/3} + .1 < 1$	A38 Solve for x: $(x-2005)^3 - (2005-x)^3 = 16$	A39 Solve for x: $\left(x+\frac{401}{4}\right)^2 - \left(x-\frac{401}{4}\right)^2 = 2005$	A40 Solve for x: $10^x + 2005^x = 2$

2005

B1

Solve for the real number x:

$x^2 - 6x + 9 = (x - 3)^{-1}$

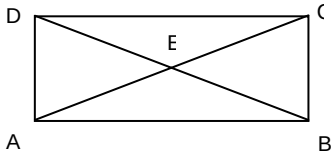
B2

What is the greatest common divisor of 999 and 1002?

B3

ABCD is a rectangle.

$\frac{area(ABE)}{area(ADE)} = ?$



B4

What is the remainder when $x^6 - 7x^3 + 1$ is divided by $x - 2$?

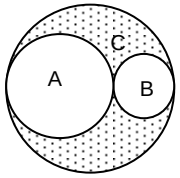
B5

True or False:

$(.75)^{1/3} + .1 < 1$

B6 Circles A, B, and C are pairwise tangent. Their centers lie on a line. The radius of circle A is twice the radius of circle B.

Simplify $\frac{\text{shaded area}}{\text{area of circle B}}$



B7

Simplify

$$\frac{x^9 - x^{-5}}{x^{-6} - x^8}$$

B8

Jack is twice as old as Jill. Seven years ago, he was three times as old as she was.

How old is Jill now?

B9

Solve for x:

$4^{5+x} = 8^x$

B10

Solve for x:

$10^x + 2005^x = 2$

B11

Find the volume in cubic inches of a cube with surface area 150 in.^{2}

B12

Find the slope of the line through the points $(2005, 2005^2)$ and $(2004, 2004^2)$.

Simplify.

B 13

$x^2 + 6x = c$

has only one solution.

What is c?

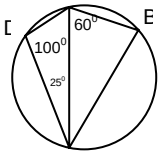
B14

A, B, C, D lie in order on a circle.

$\angle ACD = 25^0$,

$\angle ADC = 100^0$, and

$\angle BAC = 60^0$. $\angle ACB = ?$



B15

$a^2 - b^2 = 31$

a and b are positive integers.

$a = ?$

B16

Find the minimum value of

$x^2 + 6x + 2005$

for all real numbers x.

B17

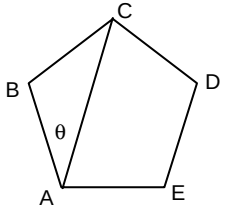
What is the least common multiple of 1203 and 2005?

B18

ABCDE is a regular pentagon.

Evaluate

$\theta = \angle BAC$ in degrees.



B19

Solve for x:

$$\left(x^{\frac{1}{2}} - 2\right)^{\frac{1}{2}} = 3\left(x^{\frac{1}{2}} + 2\right)^{-\frac{1}{2}}$$

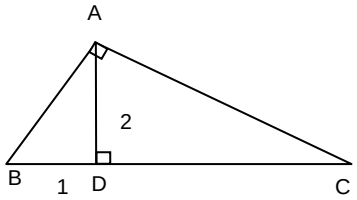
B20

How many integers from 10 through 99 have 2 as exactly one digit?

B21

$\angle BAC = 90^0 = \angle ADB$, BD = 1, and AD = 2.

AC = ?



B22

Rationalize the denominators and simplify

$$\frac{1}{\sqrt{1}+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}$$

B23

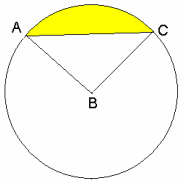
$x^2 + 9x + 5$ has roots r and s. Evaluate and simplify rs.

B24

When 3 coins are tossed, what is the probability that exactly 2 are heads?

B25

A and C lie on a circle with center B. $\angle ABC = 90^0$ and AB = 2. Find the shaded area.



B26

$$x+\frac{1}{x}=3$$

$$x^2+\frac{1}{x^2}=?$$

B27

Six points lie on a circle. How many lines contain pairs of the points?

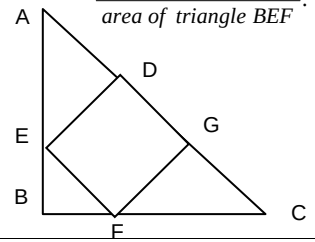
B28

How many different integers r satisfy $r^3 - 3r + 2 = 0$?

B29

ABC is an isosceles right triangle. DEFG is a square.

Simplify $\frac{area\ of\ square\ DEFG}{area\ of\ triangle\ BEF}$.



B30

$$x^{2/5}y=3$$

$$xy^2=18$$

x = ?

B31

$2005^{x^2+x+1} = 2005^{x^3-1}$

x = ?

B32

$x^2 + kx + 7$ has integer roots.

$k > 0$

k = ?

B33

A lies on the circle with diameter BC = 7.

If AB = 3, evaluate AC.

B34

Set A has 10 elements. $A \cap B$ has 2 elements, and $A \cup B$ has 17. How many elements does B have?

B35

$a + b = ab$

$a + 7b = 3ab$

$b \neq 0$

a = ?

B36

Switching the digits of a two-digit number reduces the number by 45. One digit is 3. What is the other?

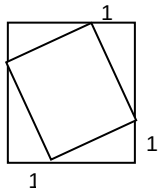
B37

Solve for x:

$$\sqrt{x^2}-x=6$$

B38

The inner square has area 5. Each right triangle has leg 1. Find the area of the outer square.



B39

Solve for x:

$$(x-2005)^3-(2005-x)^3=16$$

B40

Solve for x:

$$\left(x+\frac{401}{4}\right)^2-\left(x-\frac{401}{4}\right)^2=2005$$