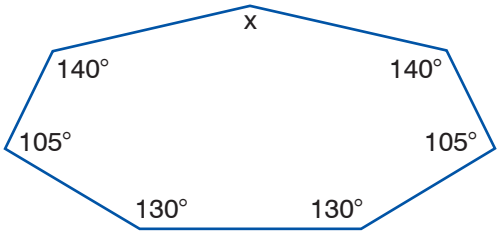
1. [Geometry, 3 Points]

The interior angles of a convex polygon with 7 sides are given below.



What is the measure of the angle x?

A) 130° B) 135° C) 140° D) 145° E) 150°

2. [Algebra, 3 Points]

A and B represent numbers, and a binary operation (*) is defined as

$$A * B = A^2 + B^2 - 2 \cdot A \cdot B.$$

What is the value of (**2 * 4**) * (**6 * 8**)?

A) 16 B) 8 C) 4 D) 0 E) –4

3. [Combinatorics, 3 Points]

In a particular city, all the telephone numbers are five-digit numbers which start with 4 or 5. The 2 and 9 buttons on Gary's telephone do not work.

How many phone numbers in the city can Gary dial on his phone if digits cannot be repeated?

A) 8192 B) 6720 C) 3360 D) 2520 E) 1680

4. [Number Theory, 3 Points]

For the integers x and y,

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

What is the sum of the possible values of x?

A) 4 B) 6 C) 7 D) 8 E) 9

5. [Algebra, 5 Points]

What is the value of $\left(1-\frac{9}{2}\right)\left(1-\frac{9}{3}\right)\left(1-\frac{9}{4}\right)\ldots\left(1-\frac{9}{71}\right)$?

A) 0 B) $\frac{5}{42}$ C) $\frac{5}{21}$ D) 1 E) None of the preceding

6. [Number Theory, 5 Points]

What is the sum of the digits of **greatest** three-digit number that has the same remainder when it is divided by 33 and 21?

A) 13 B) 14 C) 15 D) 16 E) 17

7. [Combinatorics, 5 Points]

Below table shows number of workers, number of lamps, and number of defective lamps in a lamp shop during a week.

	Monday	Tuesday	Wednesday	Thursday	Friday
Number of workers	20	18	20	18	18
Number of total produced lamps	900	800	850	750	700
Number of detective lamps	12	15	19	16	18

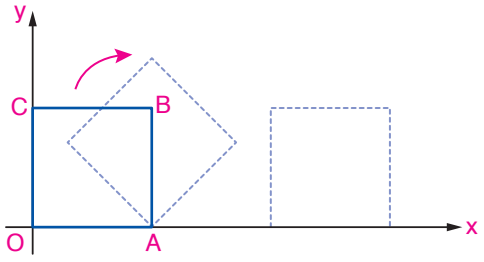
At the end of five days a lamp is chosen at random.
What is the probability of choosing a defective lamp that is produced on Tuesday?

A) $\frac{3}{1000}$ B) $\frac{1}{250}$ C) $\frac{3}{800}$ D) $\frac{9}{2000}$ E) $\frac{11}{960}$

8. [Geometry, 5 Points]

OABC is a square with 1-unit side length. This square is rotated clockwise as shown until side BC lies on the x-axis. The rotated square is O'A'B'C'

What is the equation of the line passing through the points C and C'?



A) $2y - x + 1 = 0$ B) $y + 3x + 1 = 0$ C) $3y + x - 3 = 0$
D) $y - x + 3 = 0$ E) $3y - x + 3 = 0$

9. [Combinatorics, 7 Points]

A doughnut shop offers four flavors of doughnuts: glazed, chocolate, strawberry, and cinnamon. Albert wants to buy 11 doughnuts with at least one doughnut of each flavor.
(For example, Albert may buy 1 glazed, 5 chocolate, 3 strawberry, and 2 cinnamon doughnuts)
How many possible combinations of donuts can Albert buy?

A) 84 B) 96 C) 120 D) 132 E) 144

10. [Geometry, 7 Points]

The area of the triangle formed by the x-axis, y-axis, and the line $2y = mx + 6$ is 36.
What is $|m|$?

A) $\frac{1}{16}$ B) $\frac{1}{8}$ C) $\frac{1}{4}$ D) $\frac{3}{4}$ E) $\frac{4}{3}$