Would you like to receive feedback from our execs? (marking your solutions, giving corrections, etc.)
Yes/No: _____

Multiple Choice

Highlight the correct answer for each question.

1. Lauryn has a collection of 50 songs that are each 3 minutes in length and 50 songs that are each 5 minutes in length. What is the maximum number of songs from her collection that she can play in 3 hours?

(A) 36 (B) 100 (C) 56 (D) 60 (E) 45

2. A bin contains 10 kg of peanuts. 2 kg of peanuts are removed and 2 kg of raisins are added and thoroughly mixed in. Then 2 kg of this mixture are removed and 2 kg of raisins are added and thoroughly mixed in again. What is the ratio of the mass of peanuts to the mass of raisins in the final mixture?

(A) 3 : 2 (B) 4 : 1 (C) 5 : 1 (D) 7 : 3 (E) 16 : 9

3. A total of *n* points are equally spaced around a circle and are labelled with the integers 1 to *n,* in order. Two points are called *diametrically opposite* if the line segment joining them is a diameter of the circle. If the points labelled 7 and 35 are diametrically opposite, then *n* equals:

(A) 55 (B) 56 (C) 57 (D) 58 (E) 59

4. In his last basketball game, Kevin scored 36 points. These points raised the average (mean) number of points that he scored per game from 20 to 21. To raise this average to 22 points, how many points must Kevin score in his next game?

(A) 22 (B) 23 (C) 36 (D) 37 (E) 38

5. Suppose that x and y are real numbers that satisfy the two equations:

$$x^2 + 3xy + y^2 = 909$$
$$3x^2 + xy + 3y^2 = 1287$$

What is a possible value for x + y?

(A) 23 (B) 92 (C) 41 (D) 39 (E) 27

Word Problems

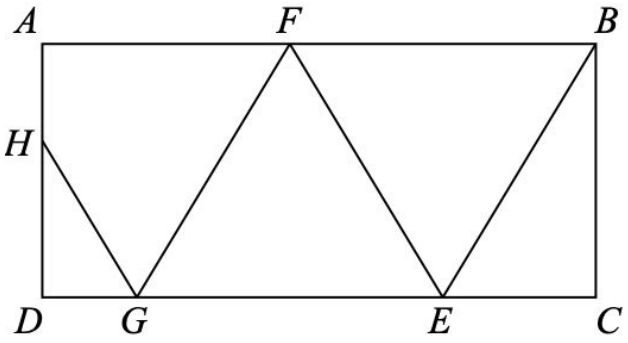
Either type your solutions or insert images of handwritten solutions. Be sure to show your work!

1. Suppose that a, b and c are positive integers with $2^a3^b5^c = 36\,000$. What is the value of 3a + 4b + 6c?

2. A three-digit positive integer *n* has digits *abc*. (*a* is the hundreds digit of *n*, *b* is the tens digit of *n*, and *c* is the ones digit of *n*). Determine the largest possible value of n for which

- *a* is divisible by 2
- the two-digit integer *ab* (*a* is the tens digit and *b* is the ones digit) is divisible by 3 but is not divisible by 6
- *n* is divisible by 5 but is not divisible by 7

3. Rectangular room ABCD has mirrors on walls AB and DC. Sharon points a laser that is placed at B. She aims it at E and the beam reflects off of the mirrors at E, F and G, arriving at H. The law of reflection tell us that ∠BEC = ∠FEG and ∠BFE = ∠AFG and ∠FGE = ∠HGD. If AB = 18 m, BC = 10 m and HD = 6 m, what is the total length of the path BEFGH travelled by the laser beam?



BONUS PUZZLE (for anyone who wants a challenge!)

A sequence of numbers begins with 12, 1112, 3112, 132112… Find the pattern among these numbers and write out the next term. (Hint!: the rule of this pattern can be described in one sentence)

Survey

Your responses will not affect your likelihood of being counted for attendance. This is simply to let our execs know how we can improve. :)

1. Approximately how much time did you spend on this problem set?

(A) Less than 15 mins
(B) 15 mins to 30 mins
(C) 30 mins to 1 hour
(D) 1 to 2 hours
(E) Over 2 hours

2. How difficult did you find this problem set?

(A) Too easy
(B) Fairly easy
(C) Neutral
(D) Fairly difficult
(E) Too difficult

Thank you for your feedback!