This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

Stage Exam 04

12FEB2024

Do NOT write in this box. Your MARK will be placed here.

Subject :	A Level : Maths M0
Class :	11A and 12A
Teacher :	Mr. George El Haber
Duration :	1 hour

Write your answers on the same paper.

Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

I. Solve the following quadratic equations using delta: **[8pts.]**

a) $x^2 + 4x + 3 = 0$

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b) $x^2 + 5x + 4 = 0$

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c) $m^2 = 6 + m$

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d) $8x^2 - 2x - 21 = 0$

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II. Solve $6x^2 + 3x - 13 = 0$ by completing the square.
Give your answer correct to 2 decimal places. **[2pts.]**

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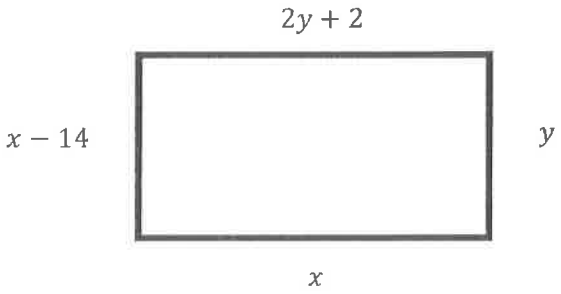
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III. The diagram shows a rectangle. All sides are measured in centimeters.



Jean says the perimeter of the rectangle is more than 75 cm.
Is jean correct? **[4pts.]**

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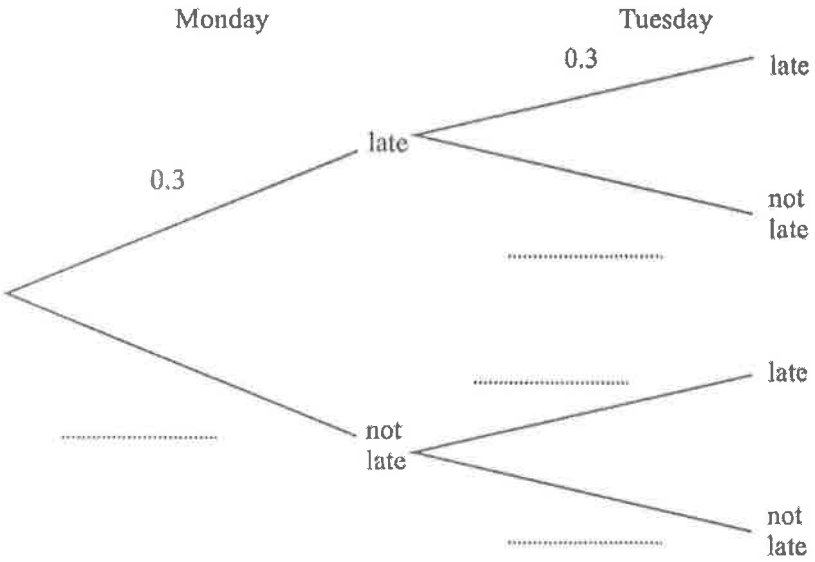
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IV. Salika travels to school by train every day. **[8pts.]**

The probability that her train will be late on any day is 0.3

(a) Complete the probability tree diagram for Monday and Tuesday.



(b) Work out the probability that her train will be late on **at least one** of these two days.

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V. A bag contains 3 black beads, 5 red beads and 2 green beads.
Gianna takes a bead at random from the bag, records its color and replaces it.
She does this two more times.

Work out the probability that, of the three beads Gianna takes, exactly two are the same color. **[4pts.]**

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VI. Phil has 20 sweets in a bag.

5 of the sweets are orange.
7 of the sweets are red.
8 of the sweets are yellow.

Phil takes at random **two** sweets from the bag.

Work out the probability that the sweets will **not** be the same color.
[4pts.]

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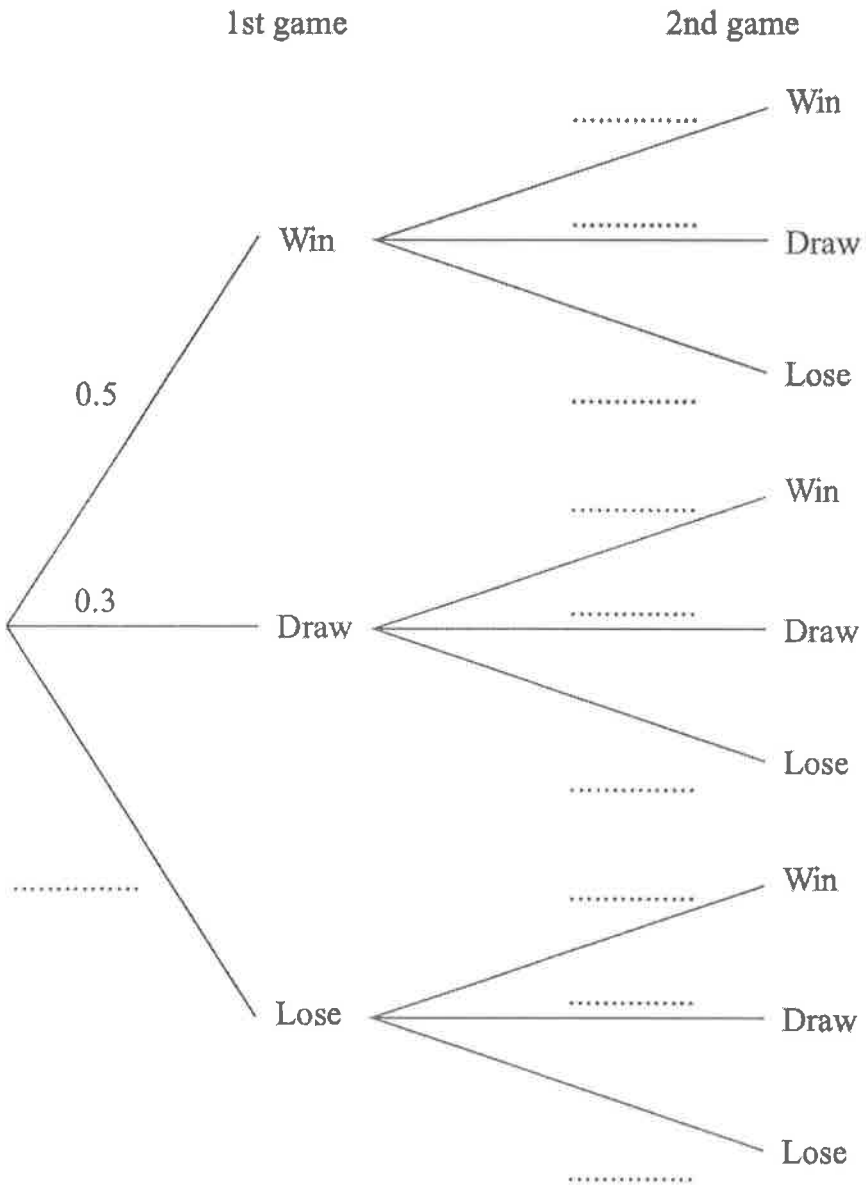
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VII. In a game of chess, a player can either win, draw or lose. **[8pts.]**

The probability that Vishi wins any game of chess is 0.5
The probability that Vishi draws any game of chess is 0.3

Vishi plays 2 games of chess.

(a) Complete the probability tree diagram.



(b) Work out the probability that Vishi will win both games.

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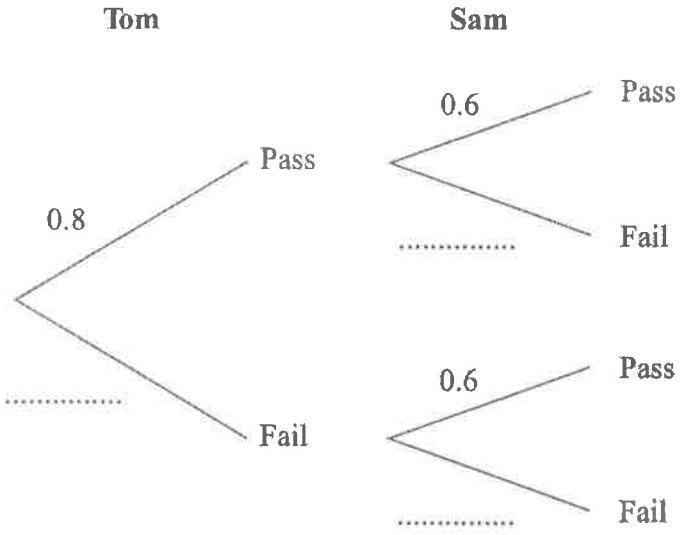
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VIII. Tom and Sam each take a driving test. **[8pts.]**

The probability that Tom will pass the driving test is 0.8

The probability that Sam will pass the driving test is 0.6

(a) Complete the probability tree diagram.



(b) Work out the probability that both Tom and Sam will pass the driving test.

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IX. Martin has a pencil case which contains 4 blue pens and 3 green pens.

Martin picks a pen at random from the pencil case. He notes its color, and then replaces it.
He does this two more times.

Work out the probability that when Martin takes three pens, exactly two are the same color. **[4pts.]**

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X. A school has 450 students.
Each student studies one of Greek or Spanish or German or French.
The table shows the number of students who study each of these languages.

Language	Number of students
Greek	45
Spanish	121
German	98
French	186

An inspector wants to look at the work of a stratified sample of 70 of these students.
Find the number of students studying each of these languages that should be in the sample. **[5pts.]**

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I. Solve the following quadratic equations using delta: **[8pts.]**

a) $x^2 + 4x + 3 = 0$

$\Delta = b^2 - 4ac$

$= 4^2 - 4(3)$

$= 4$

$x' = \frac{-b - \sqrt{\Delta}}{2a}$

$= \frac{-4 - \sqrt{4}}{2}$

$= -3$

$x'' = \frac{-b + \sqrt{\Delta}}{2a}$

$= \frac{-4 + \sqrt{4}}{2}$

$= -1$

b) $x^2 + 5x + 4 = 0$

$\Delta = b^2 - 4ac$

$= 5^2 - 4(4)$

$= 9$

$x' = \frac{-b - \sqrt{\Delta}}{2a}$

$= \frac{-5 - \sqrt{9}}{2}$

$= -4$

$x'' = \frac{-b + \sqrt{\Delta}}{2a}$

$= \frac{-5 + \sqrt{9}}{2}$

$= -1$

c) $m^2 = 6 + m$ $\quad m^2 - m - 6 = 0$

$\Delta = b^2 - 4ac$

$= (-1)^2 - 4(-6)$

$= 25$

$m' = -2$

$m'' = 3$

d) $8x^2 - 2x - 21 = 0$

$\Delta = b^2 - 4ac$

$= (-2)^2 - 4(8)(-21)$

$= 676$

$x' = -\frac{3}{2}$

$x'' = \frac{7}{4}$

II. Solve $6x^2 + 3x - 13 = 0$ by completing the square.
Give your answer correct to 2 decimal places. **[2pts.]**

$\frac{6}{6}x^2 + \frac{3}{6}x = \frac{13}{6} = 0$

$x^2 + \frac{1}{2}x = \frac{13}{6}$

$x^2 + \frac{1}{2}x + \frac{1}{16} = \frac{13}{6} + \frac{1}{16}$

$\left(x + \frac{1}{4}\right)^2 = \frac{107}{48}$

$x + \frac{1}{4} = \pm\sqrt{\frac{107}{48}}$

$x + \frac{1}{4} = \pm\frac{\sqrt{321}}{48}$

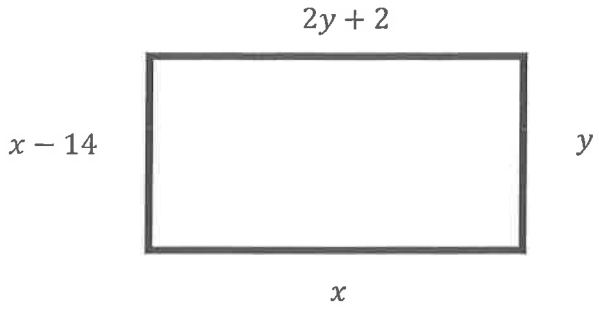
$x = -\frac{1}{4} \pm \frac{4\sqrt{321}}{48}$

$x' = 1.24304$

$x'' = -1.74304$

or $x' = \frac{-3-\sqrt{321}}{12}$ $x'' = \frac{-3+\sqrt{321}}{12}$

III. The diagram shows a rectangle. All sides are measured in centimeters.



Jean says the perimeter of the rectangle is more than 75 cm.
Is jean correct? **[4pts.]**

$\begin{cases} 2y + 2 = x \\ x - 14 = y \end{cases}$

$\begin{cases} 2y - x = -2 \\ -y + x = 14 \end{cases}$

$y = 12$

$2(12) - x = -2$

$24 - x = -2$

$-x = -2 - 24$

$x = 26$

$P = 2(l + w)$

$= 2(26 + 12)$

$= 2(38)$

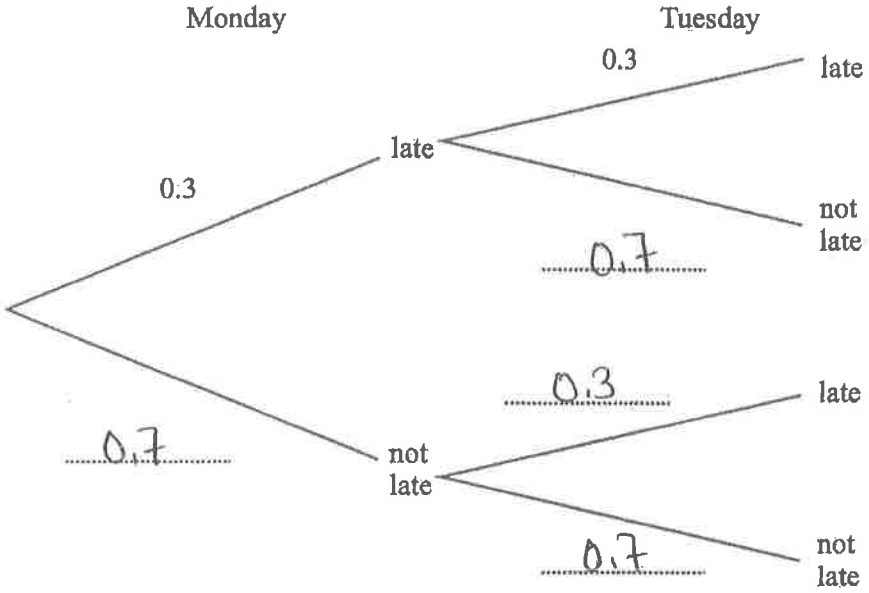
$= 76$ $P = 76$

Jean is correct

IV. Salika travels to school by train every day. **[8pts.]**

The probability that her train will be late on any day is 0.3

(a) Complete the probability tree diagram for Monday and Tuesday.



(b) Work out the probability that her train will be late on **at least one** of these two days.

P(At least on late) = 1-(0.7x0.7)

= 0.51

V. A bag contains 3 black beads, 5 red beads and 2 green beads.
Gianna takes a bead at random from the bag, records its color and replaces it.
She does this two more times.

Work out the probability that, of the three beads Gianna takes, exactly two are the same color. **[4pts.]**

$\frac{3}{10} \times \frac{3}{10} \times \frac{5}{10} = \left(\frac{45}{1000}\right)$; $\frac{3}{10} \times \frac{3}{10} \times \frac{2}{10} = \left(\frac{18}{1000}\right)$

$\frac{5}{10} \times \frac{5}{10} \times \frac{3}{10} = \left(\frac{75}{1000}\right)$; $\frac{5}{10} \times \frac{5}{10} \times \frac{2}{10} = \left(\frac{50}{1000}\right)$

$\frac{2}{10} \times \frac{2}{10} \times \frac{3}{10} = \left(\frac{12}{1000}\right)$; $\frac{2}{10} \times \frac{2}{10} \times \frac{5}{10} = \left(\frac{20}{1000}\right)$

$3 \times \left(\frac{45}{1000} + \frac{18}{1000} + \frac{75}{1000} + \frac{50}{1000} + \frac{12}{1000} + \frac{20}{1000}\right) = \frac{660}{1000}$

VI. Phil has 20 sweets in a bag.

5 of the sweets are orange.
7 of the sweets are red.
8 of the sweets are yellow.

Phil takes at random **two** sweets from the bag.

Work out the probability that the sweets will **not** be the same color.
[4pts.]

$1 - \left[\left(\frac{5}{20} \times \frac{4}{19}\right) + \left(\frac{7}{20} \times \frac{6}{19}\right) + \left(\frac{8}{20} \times \frac{7}{19}\right)\right]$

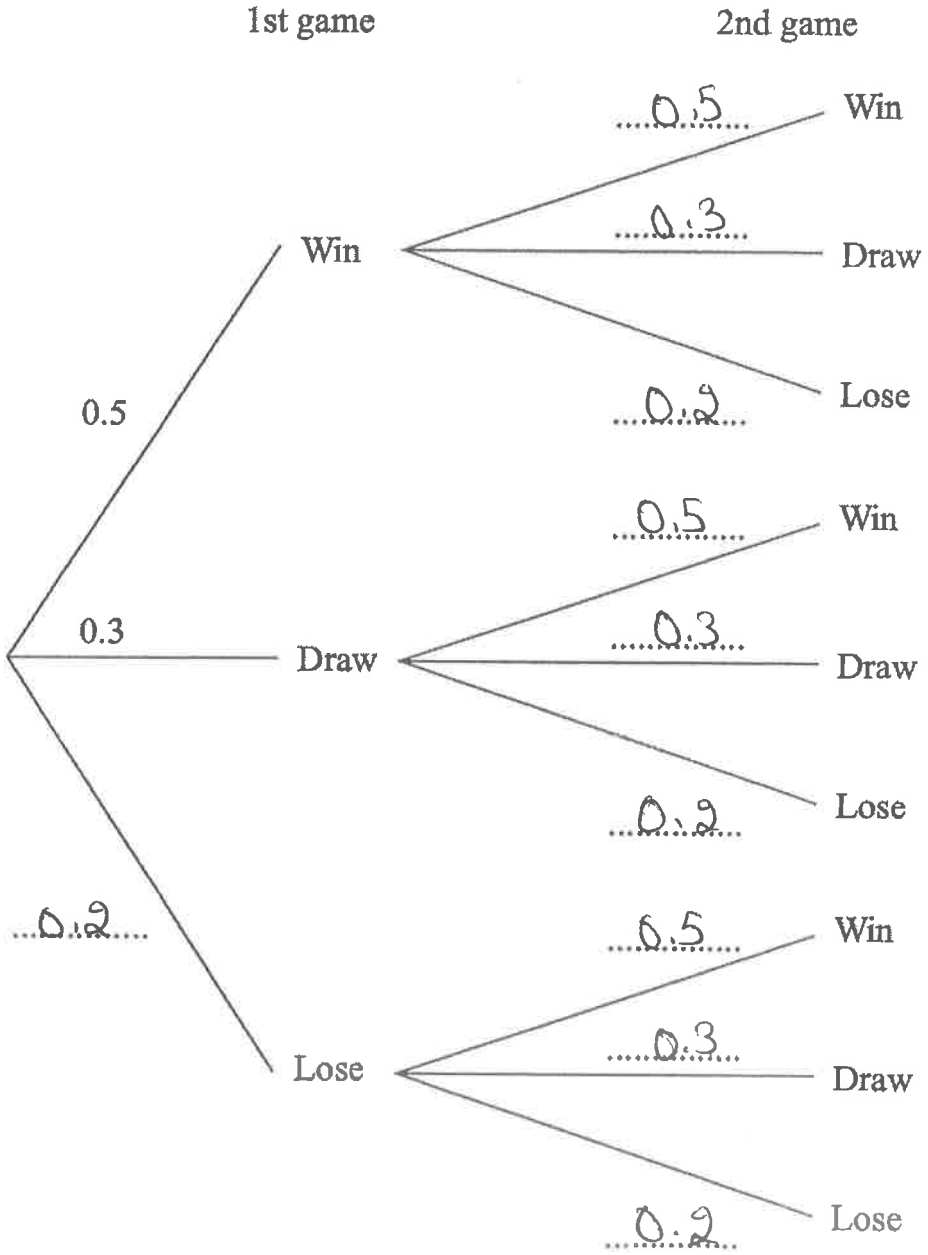
$= \frac{131}{190}$

VII. In a game of chess, a player can either win, draw or lose. [8pts.]

The probability that Vishi wins any game of chess is 0.5
The probability that Vishi draws any game of chess is 0.3

Vishi plays 2 games of chess.

(a) Complete the probability tree diagram.



(b) Work out the probability that Vishi will win both games.

P(WW) = 0.5 x 0.5

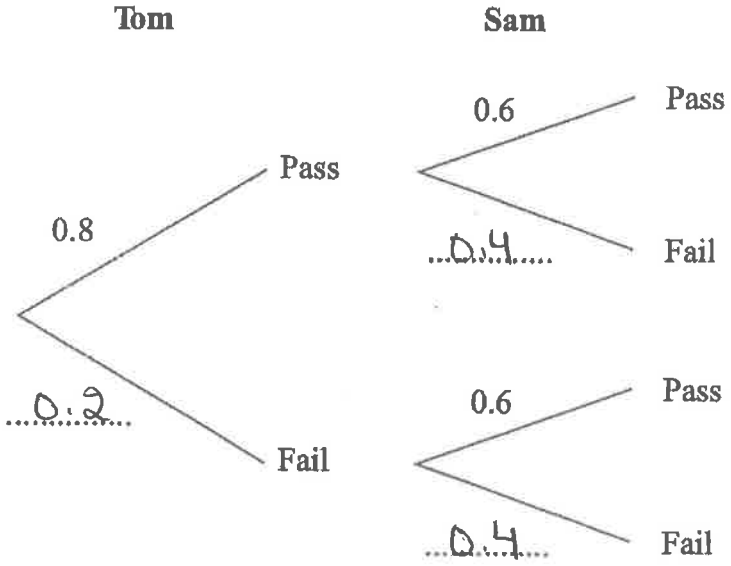
= 0.25

VIII. Tom and Sam each take a driving test. **[8pts.]**

The probability that Tom will pass the driving test is 0.8

The probability that Sam will pass the driving test is 0.6

(a) Complete the probability tree diagram.



(b) Work out the probability that both Tom and Sam will pass the driving test.

$P(PP) = 0.8 \times 0.6$

$= 0.48$

IX. Martin has a pencil case which contains 4 blue pens and 3 green pens.

Martin picks a pen at random from the pencil case. He notes its color, and then replaces it.
He does this two more times.

Work out the probability that when Martin takes three pens, exactly two are the same color. **[4pts.]**

$\left(\frac{4}{7} \times \frac{4}{7} \times \frac{3}{7}\right) + \left(\frac{3}{7} \times \frac{3}{7} \times \frac{4}{7}\right)$

$= \frac{48+36}{343} = \frac{84}{343}$ But there are three way:

BBG, BGB, GBB

So the prob. is $\frac{84}{343} \times 3$

X. A school has 450 students.
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An inspector wants to look at the work of a stratified sample of 70 of these students.
Find the number of students studying each of these languages that should be in the sample. **[5pts.]**

Greek 10%
Spanish 26.8%
German 21.7%
French 41.3%

A sample of 70 students
Greek: 70 x 10% = 7
Spanish: 70 x 26.8% = 19
German: 70 x 21.7% = 15
French: 70 x 41.3% = 29