

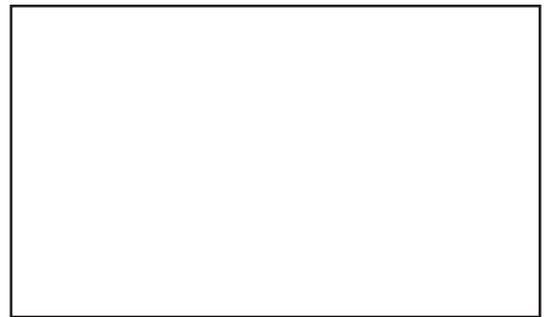


6) Use the Binomial Theorem to find the polynomial expression equivalent to  $(x + 2\sqrt{y})^5$ .

7) In a bag there are 8 red marbles, 6 green marbles, and 4 blue marbles. What is the probability of choosing a red one, followed by a green one, followed by a blue one, followed by another red one if none are replaced?

8) Easy ten points on this one. Let us say that at Beverly High, 75% of the students have cell phones (probably closer to 100%, huh?). Let us say that 30% have laptops. 15% of the students have both.

a) Create a Venn diagram at the right to determine what percent of the students have neither. Label it too.



b) If there are 1500 students at Beverly, how many have a cell phone and not a laptop?

9) Drinking a first cup of coffee in the morning raises one's alertness to 1.75 times what it was before coffee. Each succeeding cup is only 84% as effective as the one before it. Write an explicit expression for  $A_c$  (alertness as a function of cups), and state how many percent the fourth cup raises one's alertness.

10) Consider the sequence  $\frac{3}{7}, \frac{-4}{8}, \frac{5}{9}, \frac{-6}{10}, \frac{7}{11}, \dots$  Write a recursive rule for this sequence below.

- 11) Ten points for this trio of problems. Determine whether the terms or sums shown converge or diverge as  $n$  grows to infinity. If they converge, state to what value they converge.

a)  $a_n = \frac{3x^2 - 11x + 83}{14 - 2x^2}$

b)  $a_n = \frac{2n}{747}$

c)  $\sum_{n=1}^{\infty} \frac{3}{2^{n-4}}$

- 12) Write this series in SIGMA notation, using  $n$  as your index of summation:  $48 - 24 + 12 - 6 + 3 - \dots$   
Then evaluate its sum if  $n$  goes to infinity.

- 13) The 3rd and 5th terms of a geometric sequence are 24.5 and 1200.5, respectively. Write an explicit rule for this sequence.

- 14) Convert the repeating decimal,  $0.478787878\dots$  to a properly reduced fraction.

15) Prove inductively that 2 is a factor of  $(n + 1)(n + 2)$  for all positive integers  $n$ .

16) Prove inductively that 8 is a factor of  $9^n - 1$  for all all positive integers  $n$ .

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SCRATCH AREA (If you want me to look here, say so.)