FJ started a 30 day treatment program which involved daily injections of a medication. The first day's injection SCORE: _____ / 5 PTS was 12 mg, and each subsequent day's injection was 5% less than the previous day's injection. Find the total amount of the injections.

Your final answer may <u>NOT</u> use ... <u>NOR</u> \sum . It may use +, -, ×, ÷ and powers. (It does <u>NOT</u> need to be simplified into a single number.)

$$a_n = AMOUNT OF INSECTION ON NTH DAY
$$a_1 = 12$$

$$a_2 = 12(1-0.05) = 12(0.95)$$

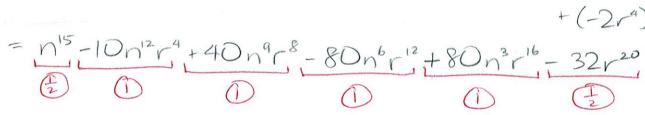
$$a_3 = 12(0.95)^2$$

$$a_n = 12(0.95)^{n-1}$$

$$a_n = 12(0.95)^{n-1}$$$$

Use Pascal's Triangle to expand and simplify $(n^3 - 2r^4)^5$. SCORE: _____/5 PTS

$$(n^3)^5 + 5(n^3)^4(-2r^4) + 10(n^3)^3(-2r^4)^2 + 10(n^3)^2(-2r^4)^3 + 5(n^3)(-2r^4)^4 + (-2r^4)^5$$



Using the formulae for the sums of the powers of integers in your textbook, find the sum $\sum_{n=1}^{\infty} (2-5n+3n^2)$. SCORE: _____/4 PTS

Your final answer may <u>NOT</u> use ... <u>NOR</u> \sum . It may use +, -, ×, ÷. (It does <u>NOT</u> need to be simplified into a single number.)

$$\frac{240}{2} 2 - 5 \sum_{n=1}^{240} n + 3 \sum_{n=1}^{240} n^{2}$$

$$= 240 \cdot 2 - 5 \cdot \frac{240(241)}{2} + 3 \cdot \frac{240(241)(481)}{6}$$

Use mathematical ind	<u>luction</u> to prove that is 3 a factor of $n^3 + 6n^2 + 5n$ for all positive integers n . SCORE:/10 PTS	
BASIS STEP	2: 3 IS A FACTOR OF 13+6(1)2+5(1)=12,0 MUST HAVE WOR	D
STEP	PASSUME 3 13 A FACTOR OF K3+6K2+5K1 ("INTEGER") FOR SOME PARTICULAR BUT ARBITRARY INTEGER KZ]	
	FOR SOME PARTICULAR BUT ARBITIRARY INTEGER REI	
	[PROVE 3 15 A FACTOR OF (K+1)3+6(K+1)3+5(K+1)]	
	(12+13+6(k+1)+5(k+1),0	
	$= k^3 + 3k^2 + 3k + 1$	
	+6k2+12k+6	4
	+5k+5	
	$= (k^3 + 6k^2 + 5k) + (3k^2 + 15k + 12)$	
×.	$= (k^3 + 6k^2 + 5k) + 3(k^2 + 5k + 4)(2)$	
	SINCE 3 IS A FACTOR OF BOTH (k3+6k2+5k) (1) AND 3(k2+5k+41)	
	THEREFORE 3 IS A FACTOR OF (K+1)3+6(K+1)2+5(K+1)	
	50, 3 1S A FACTOR OF n3+6n2+5n1)	
	FOR ALL INTEGERS N3/E	

Find the rational number representation of the repeating decimal $0.\overline{263}$ using the method discussed in lecture. NOTE: Only the 63 is repeated.

$$\begin{array}{r}
0.2 + 0.063 + 0.000000063 + 0.00000063 + \dots \\
= \frac{2}{10} + \frac{0.063}{1 - \frac{1}{100}} \\
= \frac{2}{10} + \frac{63}{1000} \boxed{21} \\
= \frac{2}{10} + \frac{63}{1000} \boxed{9911} \\
= \frac{2}{10} + \frac{7}{100} \boxed{1}$$