from II. $m^{(q-r)!+(r-p)!+(p-q)!}\times$

$$y^{(p-1)(q-r)!+(r-1)(r-p)!+(p-1)(p-q)!}$$

$$=m^0y^0=1.$$

61. In making a selection each thing may be disposed of in two ways, *i.e.*, taken or left. ∴ the 1st disposed of in 2 ways, the 2nd in 2 ways; ∴ first two in 2×2 ways, then 3rd in 2 ways, and 1st three in 2^3 ways, and so on, 1st 4 in 2^4 ways....n things disposed of 2^n ways, but this includes the case when all are left. ∴ 2^n-1 is total number of combinations.

62. Thhe number of ways of writing the 26 letters in one line is $\lfloor\underline{26}$. Consider one of these arrangements: there are 25 spaces between the 26 letters, and to indicate 8 words it is necessary to place 7 points of separation in 7 of these 25 spaces, which may be done in $\frac{\lfloor\underline{25}}{\lfloor\underline{7}\,\lfloor\underline{18}}$ different ways, and so or each of the $\lfloor\underline{26}$ arrangements. ∴ number of sentences is $\frac{\lfloor\underline{25}\,\lfloor\underline{26}}{\lfloor\underline{7}\,\lfloor\underline{18}}$.

63. Had the conditions been added—each man making one rnn at least, then the number of ways would be (as in the last example) the number of ways of placing 10 points in 79 spaces, *i.e.*, $\frac{\lfloor\underline{79}}{\lfloor\underline{10}\,\lfloor\underline{69}}$; without this condition the number will be the same as if there were 11 more runs with the condition, *i.e.*, one for each man and 80 to distribute without restriction. ∴ number of ways of making the runs is $\frac{\lfloor\underline{90}}{\lfloor\underline{10}\,\lfloor\underline{80}}$.

65. Take logarithms, then see Art. 679 Todhunter's Algebra,

$\frac{\log a+\log b+\log c+\log d}{m+n+p+q}$ lies in value between the greatest and least of $\frac{\log a}{m}$.... so will the quantity of which it is the log.

66. $(1-x)^{-2}=1+2x+3x^2+\ldots nx^{n-1}+R$

then by multiplication,

$1=(1-2x+x^2)(1+2x+3x^2+\ldots nx^{n-1}+R)$

$=1+2x+3x^2\ldots nx^{n-1}+R$

$-2x-4x^2-6x^3-(2x-2)x^{n-1}-2nx^n-2Rx$

$+x^2+2x^3-+(n-2)x^{n-1}$

$+(n-1)x^n+nx^{n+1}+x^2R.$

$0=-(n+1)x^n+nx^{n+1}+R(1-x)^2$

$$\therefore R=\frac{(n+1-nx)x^n}{(1-x)^2}.$$

(*For questions see May number.*)

CLASSICS.

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BRADLEY'S ARNOLD.

BY M. A.

Exercise 30.

1. Potest fieri ut tu homo turpissimus non dubitaturus sis servitium dignitati anteponere. 2. Negat se illi certamini juvenem interfuisse. 3. Se amicis nunquam defuturum esse pollicetur. 4. Quærenti mihi quis exercitui præesset, nihil respondit. 5. Omnes compertum habemus quam sit turpe amicis in difficili tempore deesse. 6. Neque tempori me neque duci, neque occasioni defuturum esse spondeo; sed fortuna nescio an consiliis nostris obstet. 7. Marcellum Syracusis, pulcherrimæ urbi illacrimasse dicunt. 8. Equidem vix crediderim regem nostrum, mitissimi hominem ingenii, adeo serviturum fuisse. 9. In his quæ nunc civitati instant periculis, omnes in rempublicam incumbamus. 10. Ad existimationem ejus quam plurimum pertinet, compertum nos habere utrum in acie ceciderit an sibi vim intulerit. 11. Oportuit fratri tuo, viro fortissimo, obviam excedere, domi sedere tutus maluisti. 12. Velim scire utrum patriæ sit et indicturus bellum et illaturus, an utilitates suas reipublicæ posthabiturus. 13. Ne alios ille ad simile scelus impelleret, rem ad magistratum invitus detuli. 14. Nunquam ille vel potentissimum quemque adulari, vel multitudini assentari voluit; semper sibi confidebat et omnibus se periculis objiciebat. 15. Imminet nobis quotidie fames; instant præfecto oppidani ut urbem hostibus dedat; is consilium suum mecum communicare nonvult, nec quid faciam habeo.

Exercise 50.

1. Hi ad castra nostra, sui laudandi, incusandi vestri causa, venisse dicuntur; nunc