

GR 12 MATHS – EXAM MEMOS

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NATIONAL NOV 2014 PAPER 1

► ALGEBRA AND EQUATIONS AND INEQUALITIES [21]

1.1.1 $(x-2)(4+x) = 0$

$$\begin{aligned} \therefore x-2 &= 0 & \text{or} & & 4+x &= 0 \\ \therefore x &= 2 & & & x &= -4 \end{aligned}$$

1.1.2 $3x^2 - 2x - 14 = 0$

$$\therefore x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-14)}}{2(3)}$$

$$\therefore x = \frac{2 \pm \sqrt{172}}{6}$$

$$\therefore x = 2,52 \text{ or } -1,85 <$$



1.1.3 $2^{x+2} + 2^x = 20$

$$\therefore 2^x \cdot 2^2 + 2^x = 20$$

$$\therefore 2^x(4 + 1) = 20$$

$$+5) \quad \therefore 2^x = 14$$

$$\therefore x = 2 <$$

1.2 $x = 2y + 3 \quad \dots \textcircled{1}$

$$3x^2 - 5xy = 24 + 16y \quad \dots \textcircled{2}$$

$$\textcircled{1} \text{ in } \textcircled{2}: \therefore 3(2y+3)^2 - 5y(2y+3) = 24 + 16y$$

$$\therefore 3(4y^2 + 12y + 9) - 10y^2 - 15y - 24 - 16y = 0$$

$$\therefore 12y^2 + 36y + 27 - 10y^2 - 15y - 24 - 16y = 0$$

$$\therefore 2y^2 + 5y + 3 = 0$$

$$\therefore (2y + 3)(y + 1) = 0$$

$$\therefore 2y + 3 = 0 \text{ or } y + 1 = 0$$

$$\therefore 2y = -3 \quad \therefore y = -1$$

$$\therefore y = -1$$

$$\textcircled{1}: \text{ For } y = -\frac{3}{2}: x = 2\left(-\frac{3}{2}\right) + 3 = -3 + 3 = 0$$

$$\& \text{ For } y = -1: x = 2(-1) + 3 = -2 + 3 = 1$$

$$\therefore \text{The solution: } \left(0, -\frac{3}{2}\right) \text{ or } (1, -1) <$$

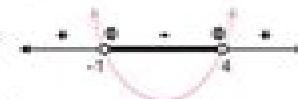
1.3 $(x-1)(x-2) < 6$

$$\therefore x^2 - 3x + 2 - 6 < 0$$

$$\therefore x^2 - 3x - 4 < 0$$

$$\therefore (x+1)(x-4) < 0$$

The expression:

 $x:$


$$\therefore -1 < x < 4 <$$

1.4 The roots are real when

$$-b-4 \geq 0 \quad \dots \Delta \geq 0$$

$$\therefore -b \geq 4$$

$$+(-1) \quad \therefore b \leq -4 <$$



► PATTERNS AND SEQUENCES [31]

2. $2 + 9 + 16 + \dots$ (to 251 terms)

2.1 $T_n = 2n - 5 <$

2.2 A.S.: $T_{251}?$: $a = 251$: $a = 2$: $d = 7$

$$T_n = a(n-1)d + T_1 \quad \therefore T_{251} = 2 + (251-1)(7) = 1752 <$$

$$\text{OR: It is a linear sequence: } T_n = an + b$$

$$\text{where } a = 7 \text{ and } b = T_1 - 5$$

$$\therefore T_n = 7n - 5$$

$$\therefore T_{251} = 7(251) - 5 = 1752 <$$

2.3 $\sum_{n=1}^{251} (7n - 5) < \dots$ if you found T_n in 2.2

$$\text{OR: } \sum_{n=1}^{251} (7n - 5) <$$


OR: Find T_n using the A.S. formula

$$T_n? : a = 2 : d = 7$$

$$T_n = a + (n-1)d \quad \therefore T_n = 2 + (n-1)(7) = 2 + 7n - 7 = 7n - 5$$

Then, sigma notation, as above.

2.4 $S_n = \frac{n}{2}(a + T_n)$, where $n = 251$: $a = 2$: $T_n = 1752$

$$\therefore S_{251} = \frac{251}{2}(2 + 1752) = 220\,127 <$$

OR:

$$S_n = \frac{n}{2}[2a + (n-1)d]$$
, where $n = 251$: $a = 2$: $d = 7$

$$\therefore S_{251} = \frac{251}{2}[2(2) + (251-1)(7)] = 220\,127 <$$

2.5 $2 + 9 + 16 + 25 + 36 + 49 + 64 + 81 + 100 + \dots$

Consider the series: $16 : 49 : 72 : \dots$

$$a? : T_n = 1752 \text{ (divisible by 4)} : a = 16 : d = 28$$

$$a + (n-1)d = T_n \quad \therefore 16 + (n-1)(28) = 1752$$

$$\therefore (n-1)(28) = 1736$$

$$\therefore n-1 = 62$$

$$\therefore n = 63$$

$$\therefore 63 \text{ terms} <$$

OR: By inspection, after 16 every 4th term is divisible by 4. So, imagining T_1 to be inserted at the start, determine the number of groups of 4 terms up to T_{251} .

$$\text{The number of groups} = \frac{252}{4} \dots 1 + 251 = 63$$

$$\therefore 63 \text{ terms divisible by 4} <$$

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and children were feeling its effects They cried over math homework so mystifying their parents could not help them even in elementary school They read motley assortments of informational text instead of classic literature They dreaded the high stakes tests in unfamiliar formats that were increasingly controlling their classrooms How did this latest and most sweeping reform of American education come in mostly under the radar Joy Pullmann started tugging on a thread of reports from worried parents and frustrated teachers and it led to a big tangle of history and politics intrigue and arrogance She unwound it to discover how a cabal of private foundation honchos and unelected public officials cooked up a set of rules for what American children must learn in core K 12 classes and how the Obama administration pressured states to adopt them Thus a federalized education scheme took root despite legal prohibitions against federal involvement in curriculum Common Core and its testing regime were touted as an absolute game changer in public education yet the evidence so far suggests that kids are actually learning less under it Why then was such a costly and disruptive agenda imposed on the nation s schools Who benefits And how can citizens regain local self governance in education so their children s minds will be fed a more nourishing intellectual diet and be protected from the experiments of emboldened bureaucrats The Education Invasion offers answers and remedies

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