perienced in preparing for semi-annual examinations for entrance to the Upper School. Instead of lessening the pressure it has actually increased it, and the difficulty of classifying Lower School pupils, some of whom take a whole year of special training for the Intermediate, while others take but six months, is now greatly intensified. There should be two promotion examinations a year in all grades from the lowest primary to the Intermediate class, and the best time for holding these examinations would be during the first week in June and the last teaching week in December.

MATHEMATICS.

Solutions to the Problems in the February Number.

9. Let ABCDE be the pentagon formed. We are required to prove it equilateral and equiangular. Let one end of the slip project through AB so that its edges are AD and BC, and let the other end project through DE, its edges being CD and BE, so that CD is parallel to BE and AD to BC; CA and DE are also parallel edges, and so are AB and CE. Draw DF perpendicular to AC and CG to AD, and let BE cut AC in H and AD in K; then CG is equal to DF, each being the width of the paper, and CD is common to the two triangles CFD, DGC, therefore the angle FCD is equal to GDC, and therefore AC eq. AD; also the ang. FDC eq. GCD and FDE, GCB are right angs., therefore ang. BCD eq. CDE and BCH eq. EDK. Because AC eq. AD and BE is parallel to CD therefore AH eq. AK; therefore in the triangles BHC, EKD we have the angs. at H, K eq. and those at CD, also HC eq. KD, hence the ang. HBC eq. KED and BC eq. ED and BH eq. KE; hence also the triangles ABH, AEK are eq. in all respects, therefore AB eq. AE and ang. ABC eq. AED. We have thus shown that AB eq. AE, BC eq. DE, the ang. ABC eq. AED, and BCD eq. CDE. Similarly by dropping perpendiculars from B, C on EC, EB we should obtain AE eq. ED, AB eq. CD, ang. EAB eq. EDC and ABC eq. BCD. These two results combined give CD eq. AB eq. AE eq. ED eq. BC and ang. A eq. D eq. C eq. B eq. E. Therefore the pentagon is equilateral and equiangular.

10. For the sake of brevity let a denote the number of gallons the cistern holds, and b the number supplied to it every minute. Then

	Taps.		Gals.	Gals.		Min.	
	24	empty	a +	$5\frac{1}{2}b$	in	$5\frac{1}{2}$	(1)
$\therefore$	24	"	$26a+143b$		"	143	
Similarly	15	"	$11a+143b$		"	143	
$\therefore$	9	"	$15a$		"	143	
	$2\frac{3}{5}$	"	a		"	33	(2)
	$15\frac{3}{5}$	"	a		"	$5\frac{1}{2}$	
$\therefore$ from (1)	$8\frac{2}{5}$	"		$5\frac{1}{2}b$	"	$5\frac{1}{2}$	
	$8\frac{2}{5}$	"		$33b$	"	33	(3)
$\therefore$ from (2) and (3)	11	"	$a+$	$33b$	"	33	

11. If $\frac{a^2+b^2-c^2-d^2}{a-b+c-d}=\frac{a^2-b^2-c^2+d^2}{a+b+c+d}$

$$\therefore \frac{a^2+b^2-c^2-d^2}{a^2-b^2-c^2+d^2}=\frac{a-b+c-d}{a+b+c+d}$$

Adding and subtracting num. and den. of these fractions we obtain

$$\frac{a^2-c^2}{b^2-d^2}=-\frac{a+c}{b+d}$$

$$\therefore \frac{a-c}{b-d}=-1 \quad \therefore 1=\frac{a+b}{c+d}$$

Multiplying both sides of this last equality by $\frac{c-d}{a-b}$ gives $\frac{c-d}{a-b}=\frac{ac-ad+bc-bd}{ac+ad-bc-bd}$

Adding and subtracting num. and den. gives