

$$183. \text{ Prove that } 1 + 3n + \frac{3 \cdot 4}{1 \cdot 2} \frac{n(n-1)}{2} + \frac{4 \cdot 5}{1 \cdot 2} \frac{n(n-1)(n-2)}{3} + \&c. \\ = 2^{n-3}(n^2 + 7n + 8). \quad (\text{Capi.})$$

$$184. \text{ Sum the series } \frac{1(x+2)}{2 \cdot 3 - (x+1)} + \frac{2(x+3)}{3 \cdot 4 - (x+2)} + \frac{3(x+4)}{4 \cdot 5 - (x+3)} + \&c., \text{ ad inf.}$$

$$185. \text{ Find the sum of } n \text{ terms of the series } \frac{1}{(x+2y+3z)(2x+3y+4z)} + \frac{1}{(2x+3y+4z)(3x+4y+5z)} + \dots$$

$$186. \text{ Sum } 1 - \frac{3}{4} + \frac{3 \cdot 5}{4 \cdot 8} - \frac{3 \cdot 5 \cdot 7}{4 \cdot 8 \cdot 12} + \&c. \text{ to infinity.}$$

187. If the sides of a triangle be cut proportionally and lines be drawn from the points of section to the opposite angles: the intersection of these lines will be in the same line, viz., that drawn from the vertex to the middle of the base.

188. Given the base and perpendicular: to construct the triangle, when the rectangle contained by the sides is equal to twice the rectangle contained by the segment of the base made by the line bisecting the vertical angle.

189. Given the perimeter of a right-angled triangle, whose sides are in geometrical progression: to construct the triangle.

190. Given the vertical angle of a triangle: find the locus of the point when the base is cut in a given ratio, if the base pass through a fixed point.

191. Find the locus of the vertex of a triangle, given base and difference of base angles.

192. Prove that if a ball of elasticity  $e$  be projected from one extremity of the diameter of a horizontal circle, in a direction making an angle  $\theta$  with the diameter such that the ball after one reflection at the curve passes through the other extremity, then

$$\sin \theta = \left( \frac{e}{1+e} \right)^{\frac{1}{2}}.$$

193. From what height must a perfectly elastic ball be let fall into a hemispherical bowl, in order that it may rebound horizontally at the first impact, and strike the lowest point of the bowl at the second.

194. A small pencil of rays diverge from a point in the axis of a double convex lens, the thickness of which equals one of its radii. Required the geometrical focus of the refracted rays.

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AT the recent Cambridge examinations, the candidates, nearly all of whom were girls, numbered 811, and only 209 failed to pass in one or other group. The Divinity prize was awarded to a woman.

DURING a recent examination in one of our Public Schools, the teacher asked, "What is a monarchy?" and was immediately answered by an eight-year old boy, "A country governed by a king." "Who would rule if the king should die?" "The queen." "And if the queen should die?" "The jack!"

TEACHERS who wish to see an array of arguments against the spelling reform should send twenty-five cents to the Authors' Publishing Company, 27 Bond Street, New York, for a copy of "The Spelling Reform Question Discussed," by E. H. Watson.

A MASSACHUSETTS boy, about as high as the counter, recently went into a book-store and asked for "a book for ten cents with a murder in it." How many of our Ontario teachers keep a sharp look-out for what their boys read either at home or during recesses at school?