Geometry Problems

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Excerpt from Sailing to Byzantium

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That is no country for old men. The young
In one another's arms, birds in the trees,
—Those dying generations—at their song,
The salmon-falls, the mackerel-crowded seas,
Fish, flesh, or fowl, commend all summer long
Whatever is begotten, born, and dies.
Caught in that sensual music all neglect
Monuments of unageing intellect.

Problems

1. In triangle ABC, $AB = 12$, $AC = 7$, and $BC = 10$. If sides AB and AC are doubled while BC remains the same, state the area of the new triangle. **i**

2. A rectangle inscribed in a triangle has its base coinciding with the base b of the triangle. If the altitude of the triangle is h, and the altitude x of the rectangle is half the base of the rectangle, state the value of the ratio $\frac{b}{x}$ **ii**

3. A 25 foot ladder is placed against a vertical wall of a building. The foot of the ladder is 7 feet from the base of the building. If the top of the ladder slips 4 feet, state the distance the foot of the ladder will slide. **iii**

4. When the circumference of a pizza is increased from 20 inches to 25 inches, how much is the radius increased by? **iv**

5. The radius of a cylindrical box is 8 inches and the height is 3 inches. State the number of inches that may be added to either the radius or the height to give the same nonzero increase in volume. **v**

6. A point is selected at random inside an equilateral triangle. From this point perpendiculars are dropped to each side. The sum of these perpendiculars is: **vi**

(A) Least when the point is the center of gravity of the triangle

(B) Greater than the altitude of the triangle

(C) Equal to the altitude of the triangle

(D) One-half the sum of the sides of the triangle

(E) Greatest when the point is the center of gravity

i 0 **ii** 2 **iii** 8 ft **iv** $\frac{5}{2\pi}$ 2 **v** 16/3 **vi** **(A), (C), (E)**