The Weekly Rigor

No. 112 "A mathematician is a machine for turning coffee into theorems." August 13, 2016

SAT Math Test Problem Children: Trigonometry

(Part 5)

ANSWERS

1. C	4. 0.4	7. C
2. 0.8	5. $\frac{1}{2}$	8. A
3. 0.6	6. $\frac{4}{5}$	9. C
	10. C	

SELECTED SOLUTIONS

1. To solve this problem, apply "SOHCAHTOA." Since $\frac{b}{a}$ is a ratio of the right triangle's two legs, the correct answer has to involve the tangent function. Hence, the correct answer can only be C or D. However, only answer C has the correct tangent function, since relative to angle *A*, the ratio of the opposite leg divided by the adjacent leg does indeed equal $\frac{b}{a}$.

2. This problem is a straightforward application of the complementary angle relationship. Angles *x* and *y* are the two complementary angles of the given right triangle. Hence, the sine of $x°$ equals the cosine of $y°$. So, the cosine of $y°$ has to equal 0.8.

5. This problem is a somewhat indirect application of the complementary angle relationship. The angle equal to $90° - x°$ *is* the complement of angle measuring $x°$. Hence, $\sin x° = \cos(90° - x°)$. So, $\cos(90° - x°)$ has to equal $\frac{1}{2}$.

7. This problem is tricky. We are given two acute angles consisting of a° and b°such that $\sin(a^\circ) = \cos(b^\circ)$. By the complementary angle relationship, $\sin(a^\circ) = \cos(90^\circ - a^\circ)$. Hence, $b^\circ = 90^\circ - a^\circ$, by substitution. So, since $a = 2k - 20$ and $b = 8k - 15$, it follows that $8k - 15 = 90 - (2k - 20)$. Thus, $8k - 15 = 90 - 2k + 20$, i.e., $10k = 125$. Therefore, $k = \frac{125}{10} = 12.5$, answer C.