$$\textit{Which of the following expressions is identically equal to } \sec(x+y)?$$

a. $\frac{\cos(x-y)}{cos^2x - sin^2y}$

b. $\frac{\cos(x+y)}{cos^2x - sin^2y}$

c. $\frac{\cos(x-y)}{cos^2x + sin^2y}$

d. $\frac{\cos(x+y)}{cos^2x + sin^2y}$

e. $\frac{\cos(x-y)}{sin^2y - cos^2y}$

$$\begin{aligned}
&\sec(x+y) \\
&= \frac{1}{\cos(x+y)} \\
&= \frac{1}{\cos x \cos y - \sin x \sin y} \\
&= \frac{1}{\cos x \cos y - \sin x \sin y} \cdot \frac{\cos x \cos y + \sin x \sin y}{\cos x \cos y + \sin x \sin y} \\
&= \frac{\cos x \cos y + \sin x \sin y}{cos^2 x \; cos^2 y - \; sin^2 x \, sin^2 y} \\
&= \frac{\cos(x-y)}{cos^2 x \; (1 - sin^2 y) - (1 - cos^2 x) \, sin^2 y} \\
&= \frac{\cos(x-y)}{(cos^2 x - cos^2 x \, sin^2 y) - (\, sin^2 y - cos^2 x \, sin^2 y)} \\
&= \frac{\cos(x-y)}{cos^2 x - sin^2 y}
\end{aligned}$$

$$\textit{The equation } a^5 + b^3 + c^2 = 2015$$

has two solutions in positive integers. Find the integer ratio of the two possible values of c.

a. 2
b. 3
c. 4
d. 5
e. 6

Two solutions are $3^5 + 9^3 + 21^2 = 2015$ *and* $3^5 + 2^3 + 42^2 = 2015$.
The possible values of c, 21 *and* 42, *have an integer ratio of* 2.

Let p *and* q *be two constants for which the equation* $4x - p = q$ *has the solution* $x = 12$.

$Find\ the\ solution\ to\ the\ equation\ 3x - q = p.$

a. -16
b. -8
c. 4
d. 8
e. 16

$If\ 4x - p = q\ when\ x = 12, then\ 48 - p = q\ and\ p + q = 48.$
$Using\ 3x - q = p, we\ have\ p + q = 3x.\ So\ 3x = 48\ and\ x = 16$