Dividing and Multiplying Exponents

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Handling exponents this a tricky part of the SAT Math Section. These questions types are rare, but recognizing them will give you an big advantage!

Dividing and Multiplying exponents.

1. When we multiply two numbers with the same base we keep the base and add the powers.

$$x^2 * x^3 = x^{2+3} = x^5$$

2. When we divide two numbers with the same base we keep the base and subtract the powers

$$\frac{x^6}{x^3} = x^{6-3} = x^3$$

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14

If $3x - y = 12$, what is the value of $\frac{8^x}{2^y}$?

A) 2^{12}

B) 4^4

C) 8^2

D) The value cannot be determined from the information given.

The key to this question is that $8 = 2^3$

Using this: $8^x = 2^{3x}$

Using the 2nd property above:

$$\frac{8^x}{2^y} = \frac{2^{3x}}{2^y} = 2^{3x-y}$$

From the information provided $3x - y = 12$

So $\frac{8^x}{2^y} = 2^{12}$

7

If $\frac{x^{a^2}}{x^{b^2}} = x^{16}$, $x > 1$, and $a + b = 2$, what is the value of $a - b$?

A) 8
B) 14
C) 16
D) 18

By the 2nd property:

$$\frac{x^{a^2}}{x^{b^2}} = x^{a^2 - b^2}$$

From this we know that $a^2 - b^2 = 16$

Remembering our factoring rules, we recognize that $a^2 - b^2 = (a + b)(a - b)$

So if $a^2 - b^2$ = 16 and $a + b = 2$

$$16 = 2(a - b)$$

So:

$$a - b = \frac{16}{2} = 8$$