

C12 - 7.2 - Separate/Factoring/Solving Exponents Notes

Solve for x

$$2(3^x) + 3^x = 243 \quad \text{let } m = 3^x$$

$$2m + m = 243$$

$$3m = 243$$

$$m = 81$$

$$3^x = 81$$

$$3^x = 3^4$$

$$x = 4$$

Check Answer:

$$2(3^x) + 3^x = 243$$

$$2(3^4) + 3^4 = 243$$

$$2(81) + 81 = 243$$

$$243 = 243$$

$$7^x + 7^{x+1} = 392$$

$$7^x + 7^x 7^1 = 392$$

$$m + 7m = 392$$

$$8m = 392$$

$$m = 49$$

$$7^x = 49$$

$$7^x = 7^2$$

$$x = 2$$

$$7^x + 7^{x+1} = 392$$

$$7^2 + 7^{2+1} = 392$$

$$49 + 343 = 392$$

$$392 = 392$$

Let $m = 7^x$

$$(2^x)^2 - 12(2^x) + 32 = 0$$

$$m^2 - 12m + 32 = 0$$

$$(m - 4)(m - 8) = 0$$

$$m - 4 = 0$$

$$m = 4$$

$$m - 8 = 0$$

$$m = 8$$

$$2^x = 4$$

$$2^x = 2^2$$

$$x = 2$$

$$2^x = 8$$

$$2^x = 2^3$$

$$x = 3$$

$$(2^x)^2 - 12(2^x) + 32 = 0$$

$$(2^2)^2 - 12(2^2) + 32 = 0$$

$$16 - 48 + 32 = 0$$

$$(2^x)^2 - 12(2^x) + 32 = 0$$

$$(2^3)^2 - 12(2^3) + 32 = 0$$

$$64 - 96 + 32 = 0$$

$$9^{2x} - 2(9^x) - 3 = 0$$

$$(9^x)^2 - 2(9^x) - 3 = 0$$

$$m^2 - 2m - 3 = 0$$

$$(m - 3)(m + 1) = 0$$

$$m - 3 = 0$$

$$m = 3$$

$$m + 1 = 0$$

$$m = -1$$

$$9^x = 3$$

$$(3^2)^x = 3^1$$

$$3^{2x} = 3^1$$

$$2x = 1$$

$$x = \frac{1}{2}$$

$$9^x = -1$$

No Solution

$$9^{2x} - 2(9^x) - 3 = 0$$

$$9^{2(\frac{1}{2})} - 2(9^{\frac{1}{2}}) - 3 = 0$$

$$9^1 - 2(3) - 3 = 0$$

$$9 - 6 - 3 = 0$$

$$0 = 0$$

$$9^{\frac{1}{2}} = \sqrt[2]{9^1} = 3$$