Solving equations with exponential terms

Solve $3^x = 20$

Solve $5^{4x-1} = 61$

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

Solve the equation $5^{2x} - 12(5^x) + 20 = 0$, giving your answer to 3sf.

Solve $3^{2x-1} = 5$, giving your answer to 3dp.

Solve $2^x 3^{x+1} = 5$, giving your answer in exact form.

Solve $3^{x+1} = 4^{x-1}$, giving your answer to 3dp.

Extension

[MAT 2011 1H] How many *positive* values x which satisfy the equation:

$$x = 8^{\log_2 x} - 9^{\log_3 x} - 4^{\log_2 x} + \log_{0.5} 0.25$$

[MAT 2013 1J] For a real number x we denote by $[x]$ the largest integer less than or equal to x. Let n be a natural number. The integral

$$\int_0^n [2^x] \, dx$$

equals:

(A) $\log_2\big((2^n - 1)!\big)$

(B) $n\, 2^n - \log_2\big((2^n)!\big)$

(C) $n\, 2^n$

(D) $\log_2\big((2^n)!\big)$