HIGHER QUICKIES

What is the remainder on dividing the polynomial $5x^3 - 4x + 8$ by $x - 2$?

If $\log_9(x) = \frac{1}{4}$, what is the value of x?

Given that $\log_{10}(x) = y\log_{10}(3) + 1$, express x in terms of y.

What is the value of $\int_0^3 (3x^2 + 4x)\,dx$?

If $y = \sin 3x - \cos x$, what is $\frac{dy}{dx}$?

The point P(7, 6) lies on a circle with centre (−5, 1) What is the length of the diameter?

What is the exact value of $\tan \frac{7\pi}{6}$?

A line L has equation $x + 3y + 7 = 0$.
What is the gradient of a line perpendicular to L?

Vectors $\boldsymbol{u}$ and $\boldsymbol{v}$ are given $\boldsymbol{u} = 2\boldsymbol{i} - \boldsymbol{j} + 5\boldsymbol{k}$ and $\boldsymbol{v} = 3\boldsymbol{i} + p\boldsymbol{j} - \boldsymbol{k}$.
If $\boldsymbol{u}$ and $\boldsymbol{v}$ are perpendicular, what is the value of p?

Two vectors, $\boldsymbol{a}$ and $\boldsymbol{b}$, are perpendicular and $|\boldsymbol{a}| = 2$ units, $|\boldsymbol{b}| = 3$ units.
What is the value of $\boldsymbol{a}.(\boldsymbol{a} + \boldsymbol{b})$?

$f(x) = 2x^2 - 4$ and $g(x) = 1 - x$ define functions on the set of real numbers.

What is the value of $f(g(2))$?

A sequence is defined by the recurrence relation $u_{n+1} = au_n + b$ and $u_0 = 4$.
Express u_2 in terms of a and b.

SOLUTIONS			
1. 40	2. √3	3. $y = 3^y + 10$	4. 45
5. 3cos3x + sinx	6. 13	7. 1/√3	8. M = -1/3
9. p = 1	10. 4	11. -2	12. $4a^2 + ab + b$