

MT11210 Hafaliadau Differol – Taflen Ymarfer 1

I'w gwblhau cyn eich tiwtorial, lle gallwch drafod y cwestiynau gyda'ch tiwtor.

1. Darganfyddwch ddatrysiadau cyffredinol yr hafaliadau differol canlynol:

- (i) $\frac{dy}{dx} = \sin 2x - e^{3x}$ [Awgrym: integriad uniongyrchol]
- (ii) $\frac{dy}{dx} = \cot 4x$ [Awgrym: defnyddiwch $\cot \theta = \frac{\cos \theta}{\sin \theta}$]
- (iii) $\frac{dy}{dx} = \frac{5}{(x+3)(x-2)}$ [Awgrym: defnyddiwch ffracsiynau rhannol]
- (iv) $\frac{dy}{dx} = \frac{x+2}{x(x+1)^2}$ [Awgrym: defnyddiwch ffracsiynau rhannol]
- (v) $\frac{dy}{dx} = \frac{2}{9 \cos^2 2x - \sin^2 2x}$ [Awgrym: defnyddiwch $t = \tan 2x$]
- (vi) $\frac{dy}{dx} = x \ln(x+1)^2 \quad (x > -1)$ [Awgrym: defnyddiwch integru fesul rhan]

2. Ysgrifennwch drefn a gradd pob un o'r hafaliadau differol isod a nodwch a ydynt yn llinol ai peidio.

- (i) $\frac{dy}{dx} + 3y = e^x$
- (ii) $\left(\frac{d^2y}{dx^2}\right)^4 + \frac{dy}{dx} = 3$
- (iii) $\frac{d^3y}{dx^3} + x\frac{dy}{dx} - 2x^2 = 0$
- (iv) $\frac{d^2y}{dx^2} + y^2 = 0$
- (v) $\frac{d^2y}{dx^2} - e^x \cos(x)\frac{dy}{dx} + 3 \sin(x)y = e^{\sin x}$
- (vi) $\frac{d^3y}{dx^3} - \left(\frac{d^5y}{dx^5}\right)^4 - \frac{dy}{dx} = -x$
- (vii) $\frac{dy}{dx} + \cos x = 0$
- (viii) $\frac{dy}{dx} + \cos y = 0$

3. Gwahanwch y newidynnau er mwyn datrys yr hafaliadau differol canlynol:

- (i) $\sin x \frac{dy}{dx} = y \cos x + \cos x$, o wybod bod $y\left(\frac{3\pi}{2}\right) = -2$.
- (ii) $x^2(y^2 + 1)\frac{dy}{dx} - y^2 = 0$, o wybod bod $y(2) = 1$.
- (iii) $(2x+3)\frac{dy}{dx} = \frac{1}{(y+2)(y-3)}$, o wybod bod $y(-2) = 1$.