1. Conceptes bàsics

1.

$$\frac{3x^2y^3}{6xy^2}$$

2.

$$2x - 5 = 9$$

3.

$$0.000345$$

4.

$$120^\circ \text{ to radians}$$

2. Límits. Funcions contínues

1.

$$\lim_{x \to 2} \frac{x^2 - 4}{x - 2}$$

2.

$$f(x) = \frac{x^2 - 1}{x - 1}$$

3.

$$f(x) = |x| \text{ at } x = 0$$

3. La derivada

1.

$$f'(x) \text{ for } f(x) = 3x^3 - 5x + 2$$

2.

$$y = e^{2x} \cdot \sin(x)$$

3.

Derivative as velocity interpretation

4. Optimització

1.

Two numbers sum to 20, product max

2.

Rectangle with perimeter 100m, max area

3.

$y = \sqrt{x}$ closest to $(4, 0)$

5. La integral per a funcions d'una variable

1.

$$\int (3x^2 - 4x + 1)\, dx$$

2.

$$\int e^{2x}\, dx$$

6. La integral definida

1.

$$\int_0^2 x^2\, dx$$

2.

$$\int_1^3 v(t)\,dt \text{ as displacement}$$

7. Equacions diferencials ordinàries de primer ordre

1.

$$\frac{dy}{dx} = 3y, \quad y(0) = 2$$

2.

$$\frac{dy}{dx} + y = e^x$$

8. Algunes equacions diferencials de la biologia i el medi ambient

1.

$$\frac{dP}{dt} = 0.2P\left(1 - \frac{P}{1000}\right)$$

2.

$$\frac{dN}{dt} = -\lambda N$$

Note: Attempt without reference, then check solutions.