Standard integrals	
	$$\int x^n \, dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$
	$$\int \frac{1}{x} \, dx = \ln x + C, \quad x > 0$$
	$$\int \sin x \, dx = -\cos x + C$$
	$$\int \cos x \, dx = \sin x + C$$
	$$\int e^x \, dx = e^x + C$$
Area under a curve between $x = a$ and $x = b$	$$A = \int_a^b y \, dx$$
Volume of revolution about the x-axis from $x = a$ to $x = b$	$$V = \int_a^b \pi y^2 \, dx$$

<u>Today's learning objective</u>:

By the end of class, I will be able to integrate using the reverse chain rule.

<u>Today's language objective</u>:

Reverse Chain Rule

[Maximum mark: 7]

non-calc

(a)   Find $\int_{1}^{2} (3x^2 - 2)\, dx$.

(b)   Find $\int_{0}^{1} 2e^{2x}\, dx$.

Steps for reverse chain rule (only necessary for part b)
1) Write integral of outer (main) function
2) Find derivative of embedded (nested) function
3) Divide by this derivative
4) Differentiate your final integral answer to ensure you have correct answer

Answers to previous slide

a) 5
b) $e^2 - 1$

The diagram below shows part of the graph of $y = \sin 2x$. The shaded region is between $x = 0$ a

non-calc
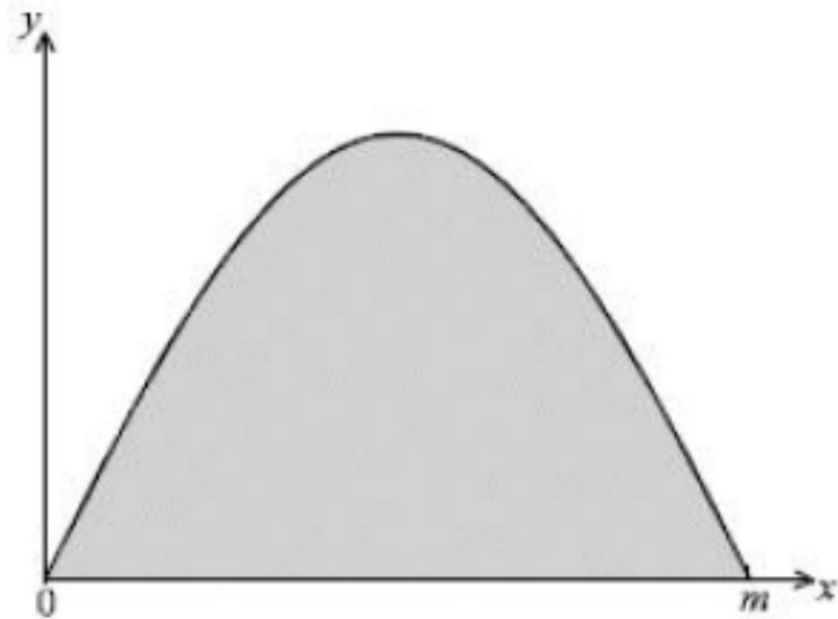
a)   Write down the period of this function.

b)   Hence or otherwise write down the value of m.

c)   Find the area of the shaded region.

(Total 10 r

Answers to previous slide

a) π
b) $\pi/2$
c) 1

[Maximum mark: 6]   non-calc

The function f is given by $f(x) = 2\sin(5x - 3)$.

(a)   Find $f''(x)$.

(b)   Write down $\int f(x)\, dx$.

Answers to previous slide

a) $-50 \sin (5x - 3)$

b) $\dfrac{-2 \cos (5x - 3)}{5}$

Let $f(x) = (3x + 4)^5$. Find

non-calc

(a) $f'(x)$;

(b) $\int f(x)dx$.

Answers to previous slide

a) $15(3x + 4)^4$

b) $\dfrac{(3x + 4)^6}{18}$

Let $f(x) = 5\cos\dfrac{\pi}{4}x$ and $g(x) = -0.5x^2 + 5x - 8$, for $0 \le x \le 9$.

non-calc u
part d)

(a) On the same diagram, sketch the graphs of f and g.

(b) Consider the graph of f. Write down

    (i) the x-intercept that lies between $x = 0$ and $x = 3$;

    (ii) the period;

    (iii) the amplitude.

(c) Consider the graph of g. Write down

    (i) the two x-intercepts;

    (ii) the equation of the axis of symmetry.

(d) Let R be the region enclosed by the graphs of f and g. Find the area of R.
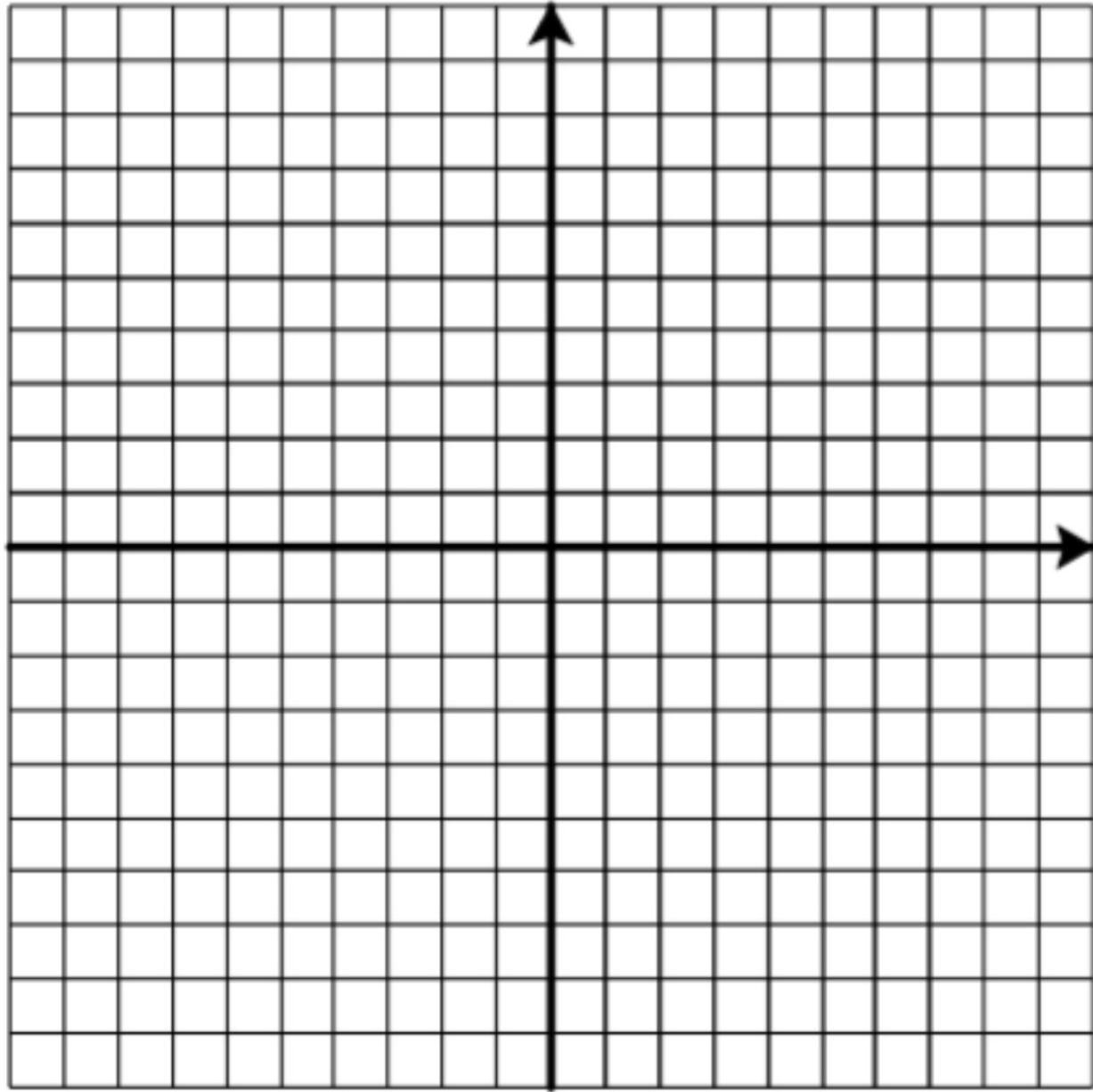
Answers to previous slide

a) graph by hand

b) $x = 2; 8; 5$

c) $x = 2$ and $x = 8; x = 5$

d) use a calc; 27.6

$$\sin(3A) = 3\sin A - 4\sin^3 A$$

$$\sin(2A+A) = \underline{\sin 2A \cos A} + \cos 2A \sin A$$

$$= 2\sin A \cos A \cos A + (1-2\sin^2 A)\sin A$$

$$= 2\sin A \cos^2 A + \sin A - 2\sin^3 A$$

$$= 2\sin A (1-\sin^2 A) + \sin A - 2\sin^3 A$$

$$= 2\sin A - 2\sin^3 A + \sin A - 2\sin^3 A$$

$$= 3\sin A - 4\sin^3 A$$