[redacted]

Why is it called "integration?"

Standard integrals	$\int x^n \, dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$ $\int \frac{1}{x} \, dx = \ln x + C, \; x > 0$ $\int \sin x \, dx = -\cos x + C$ $\int \cos x \, dx = \sin x + C$ $\int e^x \, dx = e^x + C$
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.

Find $f'(x)$ $\quad (3x^2+4)^6$

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

differential calc still!

Reverse Chain Rule

$6(3x^2+4)^5$

$\boxed{36x(3x^2+4)^5}$

$$\int \frac{(3x^2+4)^7}{7\cdot 6x} = \frac{(3x^2+4)^7}{42x}$$

$$\frac{42x(3x^2+4)^6}{42x} \qquad \frac{7(3x^2+4)^7}{42x}$$

[Maximum mark: 7]

non-calc

$8-4-1+2$

(a) Find $\int_1^2 (3x^2 - 2)\,dx$.

$\frac{\cancel{3}x^3}{\cancel{3}} - 2x$

$x^3 - 2x$

$\left[(2)^3 - 2(2)\right] - \left[(1)^3 - 2(1)\right]$

(b) Find $\int_0^1 2e^{2x}\,dx$.

$\frac{2e^{2x}}{2}$ e^{2x}

$\int e^x\,dx = e^x$

$e^{2(1)}$

$e^2 - e^0$

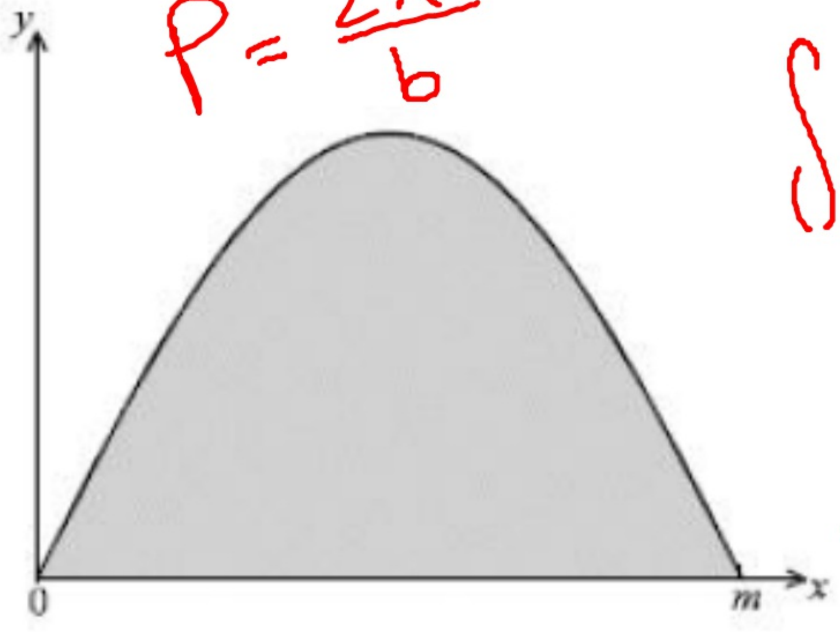
$\boxed{e^2 - 1}$

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

b

non-calc

$P = \frac{2\pi}{b}$



$\int \sin x \, dx = -\cos x$

$\left| \left(\frac{-\cos(2x)}{2} \right) \right|$

$\left| \frac{-\cos(2(\frac{\pi}{2}))}{2} \right| - \left| - \right.$

a) Write down the period of this function. π

b) Hence or otherwise write down the value of m. $\frac{\pi}{2}$

$\left| \frac{--1}{2} \right| - \left| \frac{-1}{2} \right|$

c) Find the area of the shaded region.

$\frac{1}{2} + \frac{1}{2}$

(Total 10 m

[Maximum mark: 6]

non-calc

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

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

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

$f(x) = 2\sin(5x-3)$

$2\cos(5x-3)$

$5 \cdot 2\cos(5x-3)$

$10\cos(5x-3)$

$-10\sin(5x-3)$

$\boxed{-50\sin(5x-3)}$

$\int 2\sin(5x-3)\,dx$

$$-\frac{2\cos(5x-3)}{5} + C$$

$\cos x \overset{f'(x)}{=} -\sin x$

$\int \sin x\,dx = -\cos x$

$\sin x \overset{f'(x)}{=} \cos x$

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

non-calc

(a) $f'(x)$;

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

$$(3x+4)^5$$

$$\frac{(3x+4)^6}{6}$$

$$(3x+4)^5 \quad \frac{(3x+4)^6}{6\cdot 3} = \frac{(3x+4)^6}{18} + C$$

$$5(3x+4)^4$$

$$5\cdot 3(3x+4)^4$$

$$f'(x) = 15(3x+4)^4$$

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

non-calc ur
part d)

$x = \frac{-b}{2a}$ $(5, 4.5)$ vertex

(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 $x = 3$; $x = 2$

(ii) the period; 8 $p = \frac{2\pi}{b}$

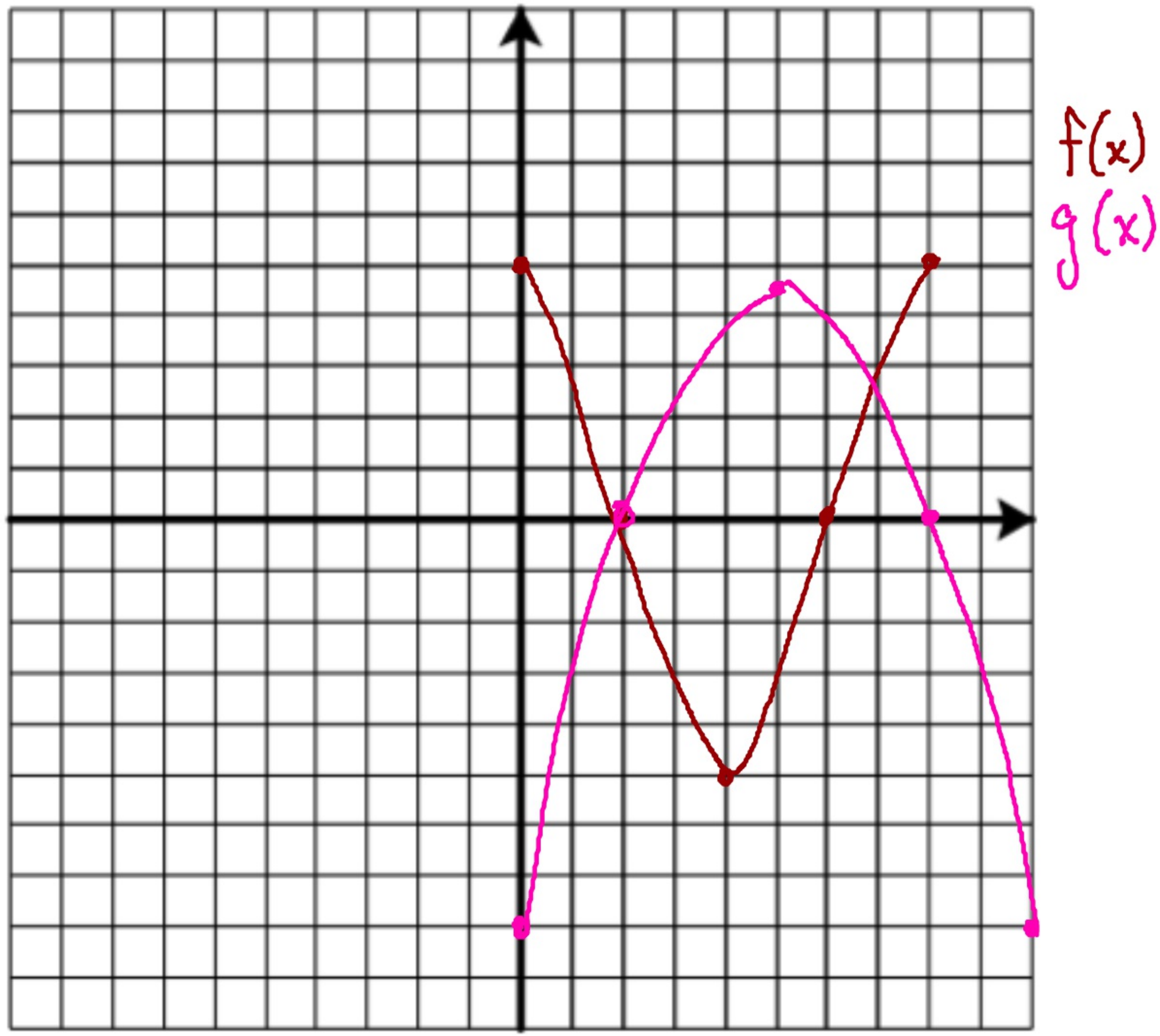
(iii) the amplitude. 5

(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.


f(x)
g(x)