MATH 3B REVIEW SECTION

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1. Area between curves

Find the area between the curves $f(x)$ and $g(x)$ where:

(1) $f(x) = -x^3/2 + 2x^2$, $g(x) = -x^2 + 4x$, $-1 \leqslant x \leqslant 3$.
(2) $f(x) = \cos x$, $g(x) = \sin 2x = 2 \sin x \cos x$, $0 \leqslant x \leqslant \pi/2$.
(3) $f(x) = \arccos x$, $g(x) = \arcsin x$, $-\pi/2 \leqslant x \leqslant \pi/2$.

2. Integrate by parts

(1) Integrate $\int_4^{4\sqrt{3}} 6 \arctan(8/x)dx$.
(2) Integrate $\int (3t + t^2)\sin(2t)dt$.
(3) Integrate $\int t^7 \sin(2t^4)dt$.

3. Partial fractions

(1) Integrate $\int \frac{x^3-2x^2}{x^4+5x^2+4}dx$.
(2) Integrate $\int \frac{x^6-1}{x^3+x^2-x-1}dx$.
(3) Integrate $\int \frac{x^4+2x^2+1}{x^3+2x^2+4x+8}dx$.

4. VOLUME OF REVOLUTION

Use both disk method and shell method to find the integral of the following solid of revolution:

(1) The area bounded by $xy = 10$, $x + y = 7$, rotating about $y = -2$.
(2) The area bounded by $x = y^2/4$, $y = 1$, $x = 5$, rotating about $x = -1$.
(3) (Hard) The area bounded by $y^2 = \ln x$, $x = e$, rotating about $x = -1$.