

201-SH3-AB - Exercises #11: Areas Between Curves

Find the area of the region enclosed by the given curves.

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| (1) $x = -2, x = 3, f(x) = -x^2 + 4, y = 0$ | (16) $y = x^2 - 18$ and $y = x - 6$ |
| (2) $x = -3, x = 1, f(x) = x^3 + 1, y = 0$ | (17) $y = 2x, y = x^2 - 3, x = -2$ and $x = 1$ |
| (3) $y = x^5 - x, y = 0, 0 \leq x \leq 2$ | (18) $y = 10 - 3x$ and $y = x^2 - 30$ |
| (4) $y = x^4 - x^3, y = 0, 0 \leq x \leq 2$ | (19) $y = x$ and $y = x^5$ |
| (5) $y = x^3 + x^2, y = 0, -1 \leq x \leq 2$ | (20) $f(x) = -x^2 + 4x + 2$ and $g(x) = x + 2$ |
| (6) $y = x^4 + x, y = 0, -1 \leq x \leq 2$ | (21) $f(x) = x^3 - 2x + 1, g(x) = -2x$ and $x = 1$ |
| (7) $y = -x^2 - x, y = 0, -1 \leq x \leq 2$ | (22) $f(x) = x^2 - 4x + 3$ and $g(x) = 3 + 4x - x^2$ |
| (8) $y = x^2 + 2, y = 0, -1 \leq x \leq 0$ | (23) $f(x) = 2x^2 + 2x, g(x) = x^2 - x + 4, x = -2$ and $x = 2$ |
| (9) $y = 4 - x^2, y = 0, -3 \leq x \leq 1$ | (24) $f(x) = x^3 - x^2 + 6, g(x) = x^2 + 3x + 6, x = -1, x = 2$ |
| (10) $y = x^3 - x^2 + x - 1, y = 0, 0 \leq x \leq 2$ | (25) $f(x) = x^4 - 16, g(x) = 4x^2 - 16, x = 0$ and $x = 3$ |
| (11) $y = x^3 + x^2 + x + 1, y = 0, -3 \leq x \leq 1$ | (26) $f(x) = -x^2 + 4x, g(x) = x^2 - 6, x = -1$ and $x = 2$ |
| (12) $y = x^3 + x^2 - 2x, y = 0, -2 \leq x \leq 1$ | (27) $f(x) = x^2, g(x) = 2x + 3, x = 0$ and $x = 4$ |
| (13) $y = x^3 + 2x, y = 0, -1 \leq x \leq 2$ | (28) $f(x) = 2x^2 - 2x, g(x) = 2x + 16, x = -3$ and $x = 0$ |
| (14) $y = x^3 - x^2, y = 0, -1 \leq x \leq 1$ | (29) $f(x) = 2x^2, g(x) = 4x + 16, x = -1$ and $x = 2$ |
| (15) $f(x) = x^3 - 1$ and the x -axis, from $x = 0$ to $x = 2$ | (30) $f(x) = x^2 - x, g(x) = x + 8, x = 0$ and $x = 5$ |

ANSWERS:

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| (1) 13 | (6) $\frac{87}{10}$ | (11) 16 | (16) $\frac{343}{6}$ | (21) 2 | (26) 18 |
| (2) 20 | (7) $\frac{29}{6}$ | (12) $\frac{37}{12}$ | (17) $\frac{23}{3}$ | (22) $\frac{64}{3}$ | (27) $\frac{34}{3}$ |
| (3) $\frac{28}{3}$ | (8) $\frac{7}{3}$ | (13) $\frac{37}{4}$ | (18) $\frac{2197}{6}$ | (23) $\frac{49}{3}$ | (28) $\frac{76}{3}$ |
| (4) $\frac{5}{2}$ | (9) $\frac{34}{3}$ | (14) $\frac{2}{3}$ | (19) $\frac{2}{3}$ | (24) $\frac{95}{12}$ | (29) 48 |
| (5) $\frac{27}{4}$ | (10) $\frac{5}{2}$ | (15) $\frac{7}{2}$ | (20) $\frac{9}{2}$ | (25) $\frac{317}{15}$ | (30) 30 |