

**201-203-RE - Practice Set #12: Areas Between Curves**

Sketch the region enclosed by the given curves, and find its area.

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| <p>(1) <math>x = -2, x = 3, f(x) = -x^2 + 4, y = 0</math></p> <p>(2) <math>x = -3, x = 1, f(x) = x^3 + 1, y = 0</math></p> <p>(3) <math>y = x^5 - x, y = 0, 0 \leq x \leq 2</math></p> <p>(4) <math>y = x^4 - x^3, y = 0, 0 \leq x \leq 2</math></p> <p>(5) <math>y = x^3 + x^2, y = 0, -1 \leq x \leq 2</math></p> <p>(6) <math>y = x^4 + x, y = 0, -1 \leq x \leq 2</math></p> <p>(7) <math>y = -x^2 - x, y = 0, -1 \leq x \leq 2</math></p> <p>(8) <math>y = x^2 + 2, y = 0, -1 \leq x \leq 0</math></p> <p>(9) <math>y = 4 - x^2, y = 0, -3 \leq x \leq 1</math></p> <p>(10) <math>y = x^3 - x^2 + x - 1, y = 0, 0 \leq x \leq 2</math></p> <p>(11) <math>y = x^3 + x^2 + x + 1, y = 0, -3 \leq x \leq 1</math></p> <p>(12) <math>y = x^3 + x^2 - 2x, y = 0, -2 \leq x \leq 1</math></p> <p>(13) <math>y = x^3 + 2x, y = 0, -1 \leq x \leq 2</math></p> <p>(14) <math>y = x^3 - x^2, y = 0, -1 \leq x \leq 1</math></p> <p>(15) <math>f(x) = x^3 - 1</math> and the <math>x</math>-axis, from <math>x = 0</math> to <math>x = 2</math></p> <p>(16) <math>y = x^2 - 18</math> and <math>y = x - 6</math></p> <p>(17) <math>y = 2x, y = x^2 - 3, x = -2</math> and <math>x = 1</math></p> <p>(18) <math>y = 10 - 3x</math> and <math>y = x^2 - 30</math></p> <p>(19) <math>x + y = 2y^2</math> and <math>x + y = 2</math></p> <p>(20) <math>x = y^2</math> and <math>x = 3 - 2y^2</math></p> <p>(21) <math>y = x</math> and <math>y = x^5</math></p> <p>(22) <math>f(x) = -x^2 + 4x + 2</math> and <math>g(x) = x + 2</math></p> | <p>(23) <math>f(x) = x^3 - 2x + 1, g(x) = -2x</math> and <math>x = 1</math></p> <p>(24) <math>f(x) = x^2 - 4x + 3</math> and <math>g(x) = 3 + 4x - x^2</math></p> <p>(25) <math>f(y) = y(2 - y)</math> and <math>g(y) = -y</math></p> <p>(26) <math>f(y) = y^2 + 1, g(y) = 0, y = -1</math> and <math>y = 2</math></p> <p>(27) <math>f(y) = y^2</math> and <math>g(y) = y + 2</math></p> <p>(28) <math>f(x) = x^2 - 4x + 3</math> and <math>g(x) = -x^2 + 2x + 3</math></p> <p>(29) <math>f(x) = (x - 1)^3</math> and <math>g(x) = x - 1</math></p> <p>(30) <math>f(y) = y^2 - 4y</math> and <math>g(y) = y - 6</math></p> <p>(31) <math>f(y) = \sqrt[3]{y}</math> and <math>g(y) = y^2</math></p> <p>(32) <math>f(y) = y^2 - 2y</math> and <math>g(y) = y - 2</math></p> <p>(33) <math>f(y) = y^2 - y</math> and <math>g(y) = y + 8</math></p> <p>(34) <math>f(x) = 2x^2 + 2x, g(x) = x^2 - x + 4, x = -2</math> and <math>x = 2</math></p> <p>(35) <math>f(x) = x^3 - x^2 + 6, g(x) = x^2 + 3x + 6, x = -1, x = 2</math></p> <p>(36) <math>f(y) = -y^2 + 2y - 2, g(y) = -2y^2 + y, y = -2, y = 2</math></p> <p>(37) <math>f(y) = 2y^3 + 4y, g(y) = y^3 - y^2 + 4y, y = -1, y = 2</math></p> <p>(38) <math>f(x) = x^4 - 16, g(x) = 4x^2 - 16, x = 0</math> and <math>x = 3</math></p> <p>(39) <math>f(x) = -x^2 + 4x, g(x) = x^2 - 6, x = -1</math> and <math>x = 2</math></p> <p>(40) <math>f(x) = x^2, g(x) = 2x + 3, x = 0</math> and <math>x = 4</math></p> <p>(41) <math>f(x) = 2x^2 - 2x, g(x) = 2x + 16, x = -3</math> and <math>x = 0</math></p> <p>(42) <math>f(x) = 2x^2, g(x) = 4x + 16, x = -1</math> and <math>x = 2</math></p> <p>(43) <math>f(x) = x^2 - x, g(x) = x + 8, x = 0</math> and <math>x = 5</math></p> |
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**ANSWERS:**

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| (1) 13              | (8) $\frac{7}{3}$    | (15) $\frac{7}{2}$    | (22) $\frac{9}{2}$  | (30) $\frac{1}{6}$   | (37) $\frac{27}{4}$   |
| (2) 20              | (9) $\frac{34}{3}$   | (16) $\frac{343}{6}$  | (23) 2              | (31) $\frac{5}{12}$  | (38) $\frac{317}{15}$ |
| (3) $\frac{28}{3}$  | (10) $\frac{5}{2}$   | (17) $\frac{23}{3}$   | (24) $\frac{64}{3}$ | (32) $\frac{1}{6}$   | (39) 18               |
| (4) $\frac{5}{2}$   | (11) 16              | (18) $\frac{2197}{6}$ | (25) $\frac{9}{2}$  | (33) 36              | (40) $\frac{34}{3}$   |
| (5) $\frac{27}{4}$  | (12) $\frac{37}{12}$ | (19) $\frac{8}{3}$    | (26) 6              | (34) $\frac{49}{3}$  | (41) $\frac{76}{3}$   |
| (6) $\frac{87}{10}$ | (13) $\frac{37}{4}$  | (20) 4                | (27) $\frac{9}{2}$  | (35) $\frac{95}{12}$ | (42) 48               |
| (7) $\frac{29}{6}$  | (14) $\frac{2}{3}$   | (21) $\frac{2}{3}$    | (28) 9              | (36) $\frac{19}{3}$  | (43) 30               |
|                     |                      |                       | (29) $\frac{1}{2}$  |                      |                       |