(1) The area of the region in the right half of the plane bounded by the curves \( y = x^2 \), \( y = 2x - 1 \), and \( y = -x \) is equal to

\[
\text{(a) } \int_{x_1}^{x_2} (x^2 - x) \, dx + \int_{x_2}^{x_3} (x^2 + 2x - 1) \, dx \\
\text{(b) } \int (x^2 - x + 1) \, dx \\
\text{(c) } \int_{x_1}^{x_2} (x^2 - x) \, dx + \int_{x_2}^{x_3} (x^2 - 2x + 1) \, dx \\
\text{(d) } \int_{x_1}^{x_2} (x^2 - x) \, dx + \int_{x_2}^{x_3} (x^2 - 2x - 1) \, dx \\
\text{(e) } \int (x^2 + x - 1) \, dx
\]

Intersection point: \( y = 2x - 1 \) \( y = -x \)
\( 2x - 1 = -x \Rightarrow 3x = 1 \Rightarrow x = \frac{1}{3} \)

\[
A = A_1 + A_2 = \int_{0}^{y_3} (x^2 + x) \, dx + \int_{y_3}^{1} (x^2 - 2x + 1) \, dx
\]

(2) The area enclosed by the curves \( y^2 = 4 - x \), \( x + 2y = 1 \) is equal to

\[
\text{(a) } \int (3 + 2y - y^2) \, dy \\
\text{(b) } \int (3 - 2y + y^2) \, dy \\
\text{(c) } \int (y^2 - 2y - 3) \, dy \\
\text{(d) } \int (y^2 - 2y - 3) \, dy \\
\text{(e) } \int (3 - 2y + y^2) \, dy
\]

Intersection points: \( y^2 = 1 - 2y \Rightarrow y - 2y - 3 = 0 \)
\( (y - 3)(y + 1) = 0 \)
\( y = 3, -1 \)

\[
A = \int_{y=-1}^{3} (x_{\text{right}} - x_{\text{left}}) \, dy
\]

\[
= \int_{-1}^{3} [(4 - y^2) - (1 - 2y)] \, dy
\]

\[
= \int_{-1}^{3} (3 + 2y - y^2) \, dy
\]
(3) The volume of the solid obtained by rotating the region bounded by the curves \( y = 1/x \), \( y = 0 \), \( x = 1 \) and \( x = 3 \) about the line \( y = 1 \) is

(a) \( \pi \int \left[ 1-(1+\frac{1}{x})^2 \right] dx \)
(b) \( \pi \int \left[ 1-(1-\frac{1}{x})^2 \right] dx \)
(c) \( \pi \int \left[ 2-(1+\frac{1}{x})^2 \right] dx \)
(d) \( \pi \int \left[ 2-(1-\frac{1}{x})^2 \right] dx \)
(e) \( \pi \int \left[ 1-(2+\frac{1}{x})^2 \right] dx \)

It is a washer.

\[ V = \pi \int_1^3 \left[ 1-(1-\frac{1}{x})^2 \right] dx \]

(4) The base of a solid is the region bounded by the curves \( y = \sqrt{x} \), \( y = 0 \), \( x = 1 \) and \( x = 2 \) if the cross-sections of the solid perpendicular to the x-axis are squares with one side lying along the base, the volume of the solid is

(a) \( \frac{3}{2} \)
(b) \( \frac{1}{2} \)
(c) \( \frac{5}{2} \)
(d) \( \frac{7}{2} \)
(e) \( \frac{9}{2} \)

Side of the square: \( s = \sqrt{x} \)

\[ \int_1^2 s^2 dx = \int_1^2 x dx = \frac{1}{2} x^2 \bigg|_1^2 = \frac{1}{2} [4-1] = \frac{3}{2} \]

(5) The volume of the solid obtained by rotating the region bounded by the curves \( y = x^3 \), \( y = 1 \) and \( x = 0 \) about the line \( x = -2 \) is

(a) \( \pi \int [2+\sqrt{y})^2 - 4] dy \)
(b) \( \pi \int [2+\sqrt{y})^2 - 4] dy \)
(c) \( \pi \int [(3+\sqrt{y})^2 - 9] dy \)
(d) \( \pi \int [(3+\sqrt{y})^2 - 9] dy \)
(e) \( \pi \int [2-\sqrt{y})^2 - 4] dy \)

Washer:

\[ V = \pi \int_0^1 [(\sqrt{y}+2)^2 - 4] dy \]