Answer key

The method: Area between two curves

Find where the curves cross. Integrate (top − bottom) between those x values.

the area between $y = -x^2 + 5x - 1$ and $y = 2x + 1$: $\frac{1}{6}$

$-x^2 + 5x - 1 = 2x + 1$ when $x^2 - 3x + 2 = 0$: $x = 1$ and $x = 2$
where they cross

$\text{area} = \int_1^2 (-x^2 + 3x - 2)\,dx$ top minus bottom

$F(x) = -\frac{x^3}{3} + \frac{3x^2}{2} - 2x$

$(-\frac{2}{3}) - (-\frac{5}{6}) = \frac{1}{6}$ F(2) − F(1)

Problems 1 and 2 worked out · Version 0A

the area between $y = -2x^2 + 7x - 8$ and $y = -3x + 4$: $\frac{1}{3}$

$-2x^2 + 7x - 8 = -3x + 4$ when $2x^2 - 10x + 12 = 0$: $x = 2$ and $x = 3$
where they cross

$\text{area} = \int_2^3 (-2x^2 + 10x - 12)\,dx$ top minus bottom

$F(x) = -\frac{2x^3}{3} + 5x^2 - 12x$

$(-9) - (-\frac{28}{3}) = \frac{1}{3}$ F(3) − F(2)

the area between $y = -2x^2 + 13x - 18$ and $y = x - 2$: $\frac{8}{3}$

$-2x^2 + 13x - 18 = x - 2$ when $2x^2 - 12x + 16 = 0$: $x = 2$ and $x = 4$
where they cross

$\text{area} = \int_2^4 (-2x^2 + 12x - 16)\,dx$ top minus bottom

$F(x) = -\frac{2x^3}{3} + 6x^2 - 16x$

$(-\frac{32}{3}) - (-\frac{40}{3}) = \frac{8}{3}$ F(4) − F(2)

Area between two curves · Version 0A

1) $\frac{1}{3}$ 2) $\frac{8}{3}$ 3) $\frac{343}{2}$ 4) 9 5) $\frac{4}{3}$ 6) $\frac{64}{3}$ 7) $\frac{1}{2}$ 8) $\frac{1}{6}$

9) 72 10) $\frac{4}{3}$