

Final Exam Review Day 2

Date _____ Period _____

For each problem, find the area of the region enclosed by the curves.

1) $y = -x^2 - 8x - 16$, $y = -x - 2$,
 $x = -6$, $x = -3$

2) $y = 2\sqrt{x}$, $y = \sqrt{x}$,
 $x = 0$, $x = 4$

A particle moves along a coordinate line. Its velocity function is $v(t)$ for $t \geq 0$. For each problem, find the position function $s(t)$.

3) $v(t) = 3t^2 - 20t$; $s(0) = 0$

4) $v(t) = -3t^2 + 30t$; $s(0) = 0$

For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the the x -axis.

5) $y = x^2$, $y = 0$, $x = 2$

6) $y = -x^2 + 1$, $y = 0$

For each problem, find the area of the region enclosed by the curves.

7) $y = -\frac{x^2}{2} + 3x - \frac{5}{2}$, $y = x^2 - 8x + 18$,
 $x = 2$, $x = 6$

8) $y = 2x^2 - 8x + 4$, $y = 2x^2 - 8x + 2$,
 $x = 1$, $x = 3$

For each problem, approximate the area under the curve over the given interval using 4 left endpoint rectangles.

9) $y = \frac{x^2}{2} + x + 1$; $[-2, 2]$

10) $y = -\frac{x^2}{2} + 6$; $[-1, 3]$

Evaluate each definite integral.

11) $\int_2^3 (x^3 - 3x^2 - 3) dx$

12) $\int_{-2}^3 (2x - 2) dx$

For each problem, use a left-hand Riemann sum to approximate the integral based off of the values in the table.

13) $\int_0^{10} f(x) dx$

x	0	1	6	8	10
$f(x)$	6	8	9	8	6

14) $\int_0^8 f(x) dx$

x	0	1	3	7	8
$f(x)$	5	7	8	7	6

For each problem, find $F'(x)$.

$$15) F(x) = \int_0^x (t^3 - 3t^2 + 6) dt$$

$$16) F(x) = \int_{-2}^x (t^3 + 3t^2 + 1) dt$$

Evaluate each indefinite integral.

$$17) \int \frac{1}{\sqrt{4-x^2}} dx$$

$$18) \int \frac{1}{x\sqrt{x^2-25}} dx$$

$$19) \int -\frac{1}{x} dx$$

$$20) \int -\frac{3}{x} dx$$

$$21) \int -24x^5 dx$$

$$22) \int -6x^2 dx$$

$$23) \int 15x^2(5x^3 + 1)^3 dx$$

$$24) \int (4x^5 + 5)^4 \cdot 20x^4 dx$$

$$25) \int 3\sin x dx$$

$$26) \int \cos x dx$$

$$27) \int 40x \cdot \csc^2(5x^2 - 4) dx$$

$$28) \int -80x^4 \sin(4x^5 - 5) dx$$

$$29) \int (3x^3 + 4)^3 \cdot 9x^2 dx$$

$$30) \int (3x^3 + 1)^5 \cdot 9x^2 dx$$

Answers to Final Exam Review Day 2 (ID: 1)

- 1) $\int_{-6}^{-3} (-x - 2 - (-x^2 - 8x - 16)) dx$
 $= \frac{21}{2} = 10.5$
- 2) $\int_0^4 (2\sqrt{x} - \sqrt{x}) dx$
 $= \frac{16}{3} \approx 5.333$
- 3) $s(t) = t^3 - 10t^2$
- 4) $s(t) = -t^3 + 15t^2$
- 5) $\pi \int_0^2 (x^2)^2 dx$
 $= \frac{32}{5}\pi \approx 20.106$
- 6) $\pi \int_{-1}^1 (-x^2 + 1)^2 dx$
 $= \frac{16}{15}\pi \approx 3.351$
- 7) $\int_2^6 \left(x^2 - 8x + 18 - \left(-\frac{x^2}{2} + 3x - \frac{5}{2} \right) \right) dx$
 $= 10$
- 8) $\int_1^3 (2x^2 - 8x + 4 - (2x^2 - 8x + 2)) dx$
 $= 4$
- 9) 5
- 10) 21
- 11) $-\frac{23}{4} = -5.75$
- 12) -5
- 13) 80
- 14) 58
- 15) $F'(x) = x^3 - 3x^2 + 6$
- 16) $F'(x) = x^3 + 3x^2 + 1$
- 17) $\sin^{-1} \frac{x}{2} + C$
- 18) $\frac{1}{5} \cdot \sec^{-1} \frac{|x|}{5} + C$
- 19) $-\ln |x| + C$
- 20) $-3 \ln |x| + C$
- 21) $-4x^6 + C$
- 22) $-2x^3 + C$
- 23) $\frac{1}{4}(5x^3 + 1)^4 + C$
- 24) $\frac{1}{5}(4x^5 + 5)^5 + C$
- 25) $-3\cos x + C$
- 26) $\sin x + C$
- 27) $-4\cot(5x^2 - 4) + C$
- 28) $4\cos(4x^5 - 5) + C$
- 29) $\frac{1}{4}(3x^3 + 4)^4 + C$
- 30) $\frac{1}{6}(3x^3 + 1)^6 + C$