AP Calculus - #Review 4B

Evaluate each indefinite integral.

1) $\int 12x^3\,dx$

$3x^4 + C$

2) $\int (5x^4 + 9x^2)\,dx$

$x^5 + 3x^3 + C$

3) $\int \frac{25\sqrt[3]{x^2}}{3}\,dx$

$5x^{\frac{5}{3}} + C$

4) $\int \left(-\frac{14\sqrt[5]{x^2}}{5} + \frac{8\sqrt[3]{x}}{3}\right)dx$

$-2x^{\frac{7}{5}} + 2x^{\frac{4}{3}} + C$

5) $\int \frac{1}{\sec x}\,dx$

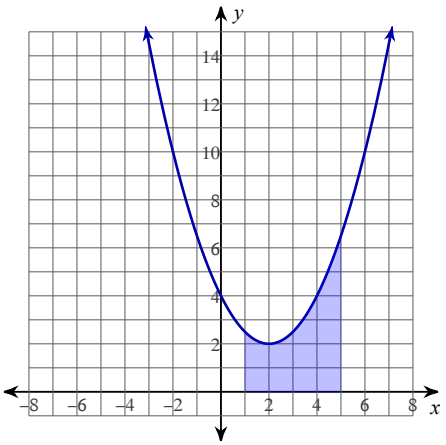
$\sin x + C$

6) $\int \frac{1}{\cos^2 x}\,dx$

$\tan x + C$

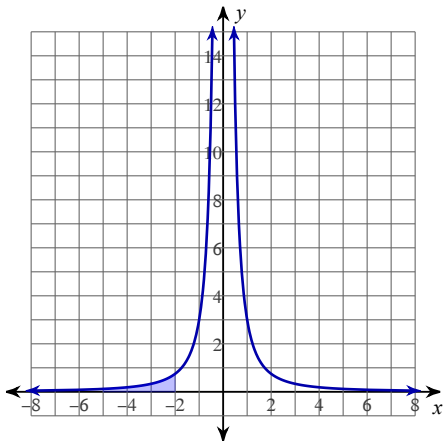
For each problem, find the area under the curve over the given interval. Set up, but do not evaluate the integral.

7) $y = \frac{x^2}{2} - 2x + 4;\ [1, 5]$



$\int_1^5 \left(\frac{x^2}{2} - 2x + 4\right)dx$

8) $y = \frac{3}{x^2};\ [-5, -2]$



$\int_{-5}^{-2} \frac{3}{x^2}\,dx$

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

9) $a(t) = -12t^2 + 60t;\ s(0) = 0;\ v(0) = 0$

$s(t) = -t^4 + 10t^3$

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

10) $v(t) = 3t^2 - 26t + 40;\ s(0) = 0$

$s(t) = t^3 - 13t^2 + 40t$

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

11) $F(x) = \int_3^x (t^2 - 4t - 1)\,dt$

$F'(x) = x^2 - 4x - 1$

12) $F(x) = \int_{-3}^{x^2} (t^2 + 6t + 11)\,dt$

$F'(x) = 2x^5 + 12x^3 + 22x$

For each problem, find the average value of the function over the given interval.

13) $f(x) = 2x - 2;\ [-1, 4]$

1

14) $f(x) = -2x^2 - 8x - 6;\ [-4, -1]$

0

For each problem, find the values of c that satisfy the Mean Value Theorem for Integrals.

15) $f(x) = 2x + 1;\ [-4, 0]$

-2

16) $f(x) = -x^2 + 6x - 9;\ [1, 4]$

2, 4

Evaluate each definite integral.

17) $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \cos x\,dx$

$\frac{2 - \sqrt{3}}{2} \approx 0.134$

18) $\int_{-3}^{0} (-x^3 - 4x^2 - 4x - 4)\,dx$

$-\frac{39}{4} = -9.75$

19) $\int_{-2}^{-1} -6x(x^2 - 1)^2\,dx$

27

20) $\int_{-1}^{0} \frac{6x}{(x^2 + 2)^2}\,dx$

$-\frac{1}{2} = -0.5$