Today's Plan:

Learning Target (standard): I will review integration.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, and complete test problems.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide test problems.

Assessment: Board work, homework check and test

Differentiation: Students will work at the board, go over and correct homework at their seats, and actively engage in test problems.

H. Calculus ~ Integration   Name_____

Review

Evaluate each indefinite integral.

1) $\int (x^4 - 3)^{-5} \cdot 4x^3 \, dx$

$$-\frac{1}{4(x^4 - 3)^4} + C$$

2) $\int \frac{8x}{(4x^2 + 1)^5} \, dx$

$$-\frac{1}{4(4x^2 + 1)^4} + C$$

3) $\int 8x \sqrt[3]{4x^2 + 5} \, dx$

$$\frac{3}{4}(4x^2 + 5)^{\frac{4}{3}} + C$$

4) $\int 25x^4(5x^5 + 3)^{-4} \, dx$

$$-\frac{1}{3(5x^5 + 3)^3} + C$$

5) $\int \frac{15x^2}{(5x^3 + 1)^4} \, dx$

$$-\frac{1}{3(5x^3 + 1)^3} + C$$

6) $\int 4x \sqrt[3]{2x^2 - 3} \, dx$

$$\frac{3}{4}(2x^2 - 3)^{\frac{4}{3}} + C$$

7) $\int 25x^4 \sqrt{5x^5 - 1} \, dx$

$$\frac{2}{3}(5x^5 - 1)^{\frac{3}{2}} + C$$

8) $\int (x^3 + 4)^{-3} \cdot 3x^2 \, dx$

$$-\frac{1}{2(x^3 + 4)^2} + C$$

9) $\int 16x^3(4x^4 - 5)^{\frac{6}{5}} \, dx$

$$\frac{5}{11}(4x^4 - 5)^{\frac{11}{5}} + C$$

10) $\int (2x^4 + 3)^5 \cdot 8x^3 \, dx$

$$\frac{1}{6}(2x^4 + 3)^6 + C$$

Evaluate each definite integral.

11) $\int_{-7}^{-3} 2(x+2)^{\frac{1}{3}}\, dx$

$\dfrac{3 - 15\sqrt[3]{5}}{2} \approx -11.325$

12) $\int_{-6}^{-3} \left(-x^3 - 11x^2 - 35x - 29\right) dx$

$-\dfrac{15}{4} = -3.75$

13) $\int_{-5}^{-3} \dfrac{1}{(2x+2)^2}\, dx$

$\dfrac{1}{16} \approx 0.063$

14) $\int_{0}^{1} -\dfrac{5}{(x+1)^3}\, dx$

$-\dfrac{15}{8} = -1.875$

15) $\int_{-4}^{-3} \left(-2x^2 - 12x - 19\right) dx$

$-\dfrac{5}{3} \approx -1.667$

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

16) $f(x) = -2x + 2;\ [-2, 3]$

1

17) $f(x) = -2x;\ [-1, 3]$

-2

18) $f(x) = x - 2;\ [4, 7]$

$\dfrac{7}{2} = 3.5$

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

-1

20) $f(x) = -x^2 - 2x - 3;\ [-3, 1]$

$-\dfrac{10}{3} \approx -3.333$

Evaluate.

$$\int_0^2 x^2 \sqrt{x^3 + 1}\, dx \quad \Rightarrow \quad \frac{1}{3}\int_1^9 u^{\frac{1}{2}}\, du$$

$u = x^3 + 1 \qquad x = 2$
$\qquad\qquad\qquad u = 8 + 1$
$du = 3x^2\, dx \qquad x = 0$
$\frac{1}{3} du = x^2\, dx \qquad u = 0 + 1$

$= \frac{1}{3}\left(\frac{2}{3} u^{\frac{3}{2}}\right)\Big|_1^9$

$= \frac{2}{9}\left(9^{\frac{3}{2}} - 1^{\frac{3}{2}}\right)$

$= \frac{2}{9}(27 - 1)$

$= \dfrac{52}{9}$