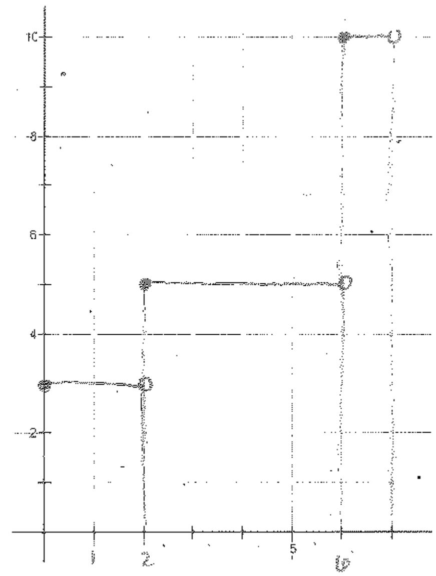
Trig/Analyt
Worksheet: Area Practice

Name Marc

1. Draw a graph of the piecewise function, on the axes provided and find $A(f, 0 \le x \le 7)$



$$f(x) = \begin{cases} 3, & 0 \le x < 2 \\ 5, & 2 \le x < 6 \\ 10, & 6 \le x \le 7 \end{cases}$$

$2 \times 3 = 6$
$4 \times 5 = 20$
$1 \times 10 = 10$
36 un²

2. Write sigma notation for the following sums:

a. $4(2)^3 + 4(2.3)^3 + 4(2.6)^3 + \ldots + 4(4.1)^3$

$\boxed{\sum_{x=0}^{7} 4(.3x+2)^3}$

$4.1 = .3x + 2$
$2.1 = .3x$
$7 = x$

b. $\dfrac{2}{1.5^2} + \dfrac{2}{2^2} + \dfrac{2}{2.5^2} + \ldots + \dfrac{2}{8.5^2}$

$\boxed{\sum_{x=0}^{14} \frac{2}{(.5x+1.5)^2}}$

$.5x + 1.5 = 8.5$
$.5x = 7$
$x = 14$

c. $5^1 + 5^{1.6} + 5^{2.2} + \ldots + 5^{13}$

$\boxed{\sum_{x=0}^{20} 5^{(.6x+1)}}$

$.6x + 1 = 13$
$.6x = 12$
$x = 20$

3. Simplify the rational expressions.

a. $\frac{(x+1)}{(x+1)}\dfrac{x}{x-1} + \dfrac{x}{x+1}\frac{(x-1)}{(x-1)}$

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

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

b. $\dfrac{x^2 - 6x + 8}{x^2 - 16} \bullet \dfrac{x+4}{3x^2 - 6x}$

$$\frac{\cancel{(x-4)}\cancel{(x-2)}}{\cancel{(x-4)}\cancel{(x+4)}} \cdot \frac{\cancel{x+4}}{3x\cancel{(x-2)}}$$

$$\boxed{\frac{1}{3x}}$$

4. Use 8 rectangles to estimate the right, left and trapezoid approximations of the area under the curve $g(x) = 10 - x^2$ from x= − 1 to x= 3. [ $A(g, -1 \le x \le 3)$ ]

a. Left Upper: 32.5     b. Right Lower: 28.5     c. Trapezoid: 30.5

d. Write the left and right endpoint sums **in sigma notation** that calculate the approximations above:

$\frac{4}{8} = .5$

| Left | Right |
|---|---|
| $\sum_{x=0}^{7} .5(10-(.5x-1)^2)$ | $\sum_{x=1}^{8} .5(10-(.5x-1)^2)$ |
| 32.5 | 28.5 |

e. Use your calculator **SUM program** to check your rule that you used in part c (remember to enter your rule (argument) into Y1). Do you get the same answers for the left and right endpoint sums that you got in parts a and b above? If not, modify your summation notation rule or indices until you get the correct answers. :)

5. Let $h(x) = \begin{cases} 2x+1 & \text{for } x \le -1 \\ x^2 - 2 & \text{for } x > -1 \end{cases}$

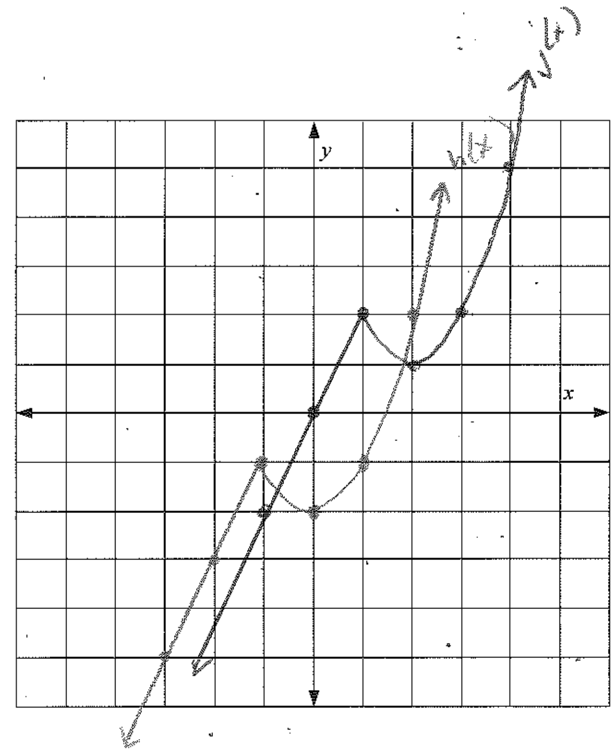
| 2x+1 | |
|---|---|
| -1 | -1 |
| -2 | -3 |
| -3 | -5 |

| x²-2 | |
|---|---|
| -1 | -1 |
| 0 | -2 |
| 1 | -1 |
| 2 | |

a. Graph $h(x)$ on the grid at right.

b. Graph $j(x) = h(x-2) + 3$ on the same grid.

c. Label each graph.




$2(x-2)+1+3$
$2x-4+1+3$
$2x$

$(x-2)^2 - 2 + 3$
$x^2 - 4x + 4 - 2 + 3$
$x^2 - 4x + 5$

d. Write an equation for $j(x)$:

$$j(x) = \begin{cases} 2x & \text{for } x \le 1 \\ (x-2)^2 + 1 & \text{for } x > 1 \end{cases}$$

$x^2 - 4x + 5$

e. Is $h(x)$ continuous? yes