Precalc15.3

Find values of integrals
Find the area under the curve of polynomial graphs

antiderivative

integral

indefinite integral

definite integral

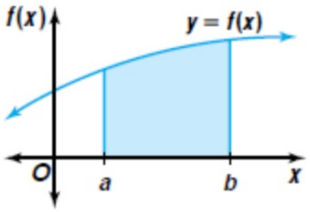
integration

$f = 6x^3 + x^2$

$F = 6\left(\frac{x^4}{4}\right) + \frac{x^3}{3}$

$1.5x^4 + \frac{x^3}{3} + C$

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



Activity: cut & paste

Sum of a series p.962
Note for future reference

$$1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$$

$$1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

$$1^3 + 2^3 + 3^3 + \cdots + n^3 = \frac{n^2(n+1)^2}{4}$$

$$1^4 + 2^4 + 3^4 + \cdots + n^4 = \frac{6n^5 + 15n^4 + 10n^3 - n}{30}$$

$$1^5 + 2^5 + 3^5 + \cdots + n^5 = \frac{2n^6 + 6n^5 + 5n^4 - n^2}{12}$$

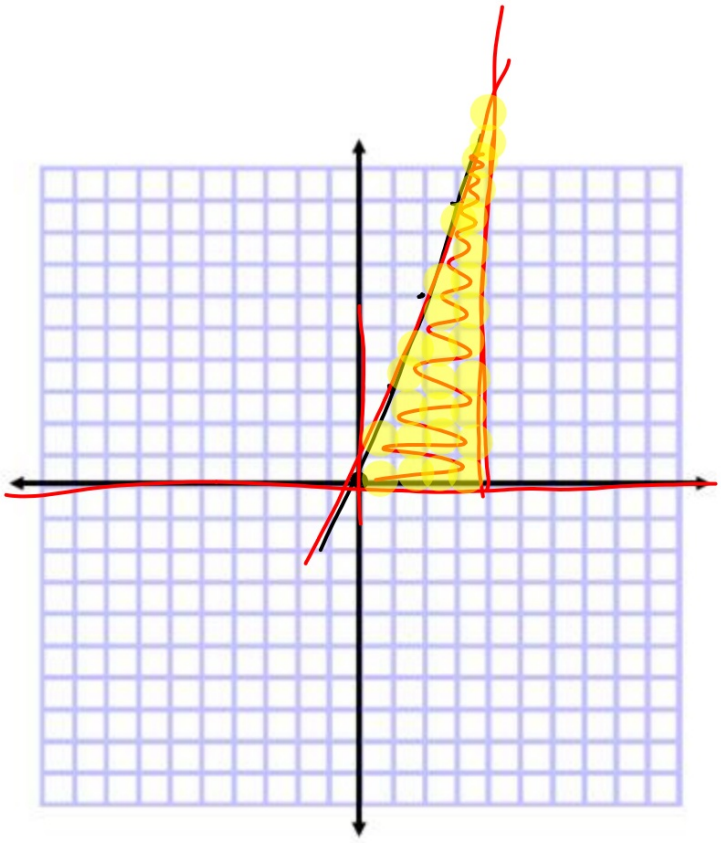
Find the area between x=0 and x=4

f(x) = 3x + 0

f(4)

$A = \frac{1}{2} \cdot 4(12)$

$= 24$



Find the area between x = 0 and x = 6

f(x) = 2x + 4

$2 \cdot 6 + 4$

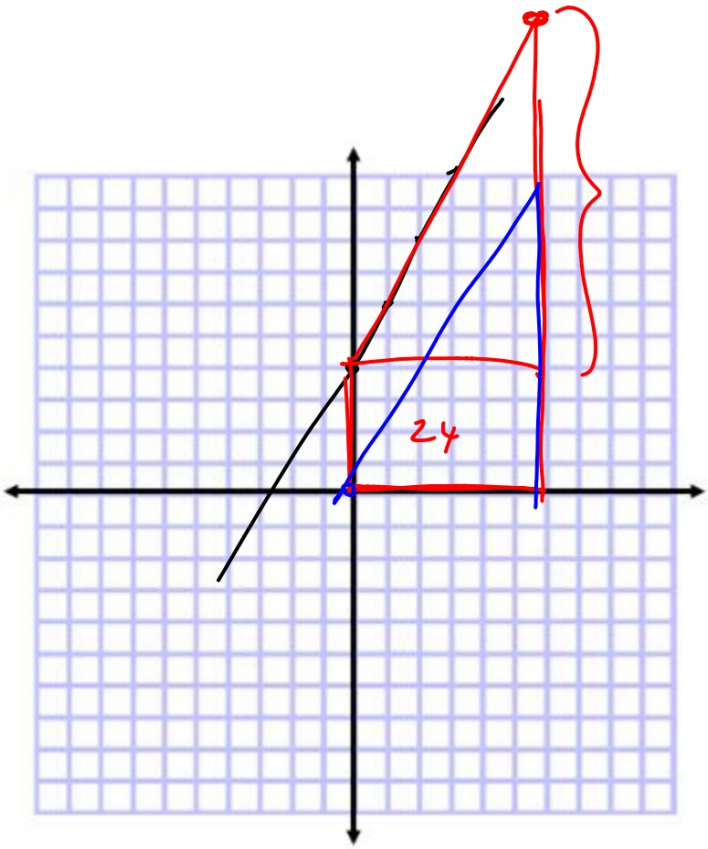
$12 + 4$

16

$= \frac{1}{2} b h$

$= \frac{1}{2} 6 \cdot 12$

$= 36$

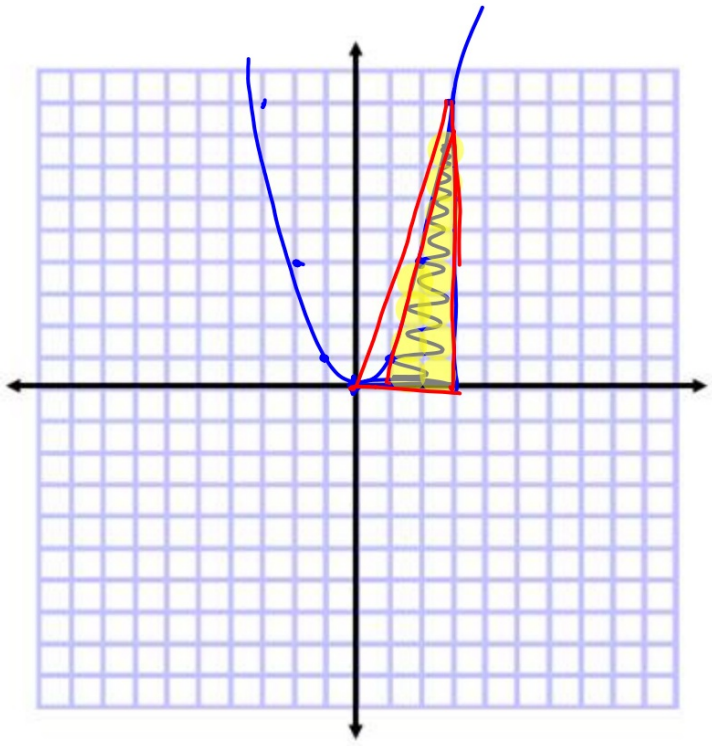


Find the area between x = 0 and x = 3
$f(x) = x^2$

$\frac{1}{2} \cdot 3 \cdot 9 =$

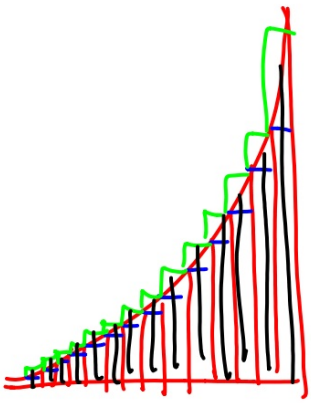
$\frac{1}{2} \cdot 2 \cdot 9$

over 12 13.5
under 6 9
best estimate 9



Cut & paste activity

(you can only use rectangles)



$\lim_{x \to 0}$

Is there a way to get a better estimate? How?

P 968
35-41