

## Lesson 97- Area of a Triangle.notebook

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Lesson 97 Objective: SWBAT find the area of a triangle given the vertices.

Kickoff

Complete questions 2 and 7 from the homework packet.

$$2) \frac{3x+1}{(x-5)^2} = \frac{A(x-5)}{x-5} + \frac{B}{(x-5)^2}$$

$$3x+1 = Ax - 5A + B$$

$$\begin{cases} 3x = Ax \\ 1 = -5A + B \end{cases} \rightarrow \begin{cases} 3 = A \\ 1 = -5(3) + B \end{cases}$$

$$\begin{cases} 1 = -15 + B \\ B = 16 \end{cases}$$

$$\frac{3}{x-5} + \frac{16}{(x-5)^2}$$

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$$7) \frac{-2x^2 - 5x - 1}{(x+2)^3} = \frac{A(x+2)}{x+2} + \frac{B(x+2)}{(x+2)^2} + \frac{C}{(x+2)^3}$$

$$-2x^2 - 5x - 1 = A(x+2)(x+2) + B(x+2) + C$$

$$\boxed{-2x^2 - 5x - 1 = Ax^2 + 4Ax + 4A + Bx + B + C}$$

$$\begin{aligned} -2x^2 &= Ax^2 \\ -5x &= 4Ax + Bx \\ -1 &= 4A + B + C \end{aligned}$$

$$\begin{aligned} -5 &= 4(-2) + B \\ -5 &= -8 + B \\ 3 &= B \end{aligned}$$

$$\begin{aligned} -1 &= 4(-2) + (3)2 + C \\ -1 &= -8 + 6 + C \\ -1 &= -2 + C \end{aligned}$$

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

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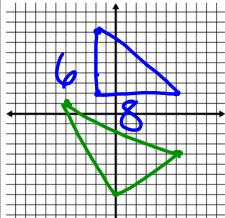
$$\begin{aligned} \textcircled{1} & \quad \frac{-7}{x+3} + \frac{6x^2}{(x+3)^2} \\ \textcircled{3} & \quad \frac{x+2}{x+4} + \frac{-3x-6}{(x+4)^2} = \frac{Ax+B}{(x+4)^2} \\ x^2+2x^2 &= x^2+8x+12 \quad Ax^2+Ax+Bx^2+bx+12 \\ x^4+4x^3+4x^2 &= x^4+8x^3+12x^2 \quad Ax^4+Ax^3+Bx^4+bx^3+12x^2 \\ x^4+8x^3+12x^2 &= Ax^4+Ax^3+Bx^4+bx^3+12x^2 \quad \cancel{Ax^4} \cancel{Ax^3} \cancel{Bx^4} \cancel{bx^3} \\ x^2+8x^2 &= Ax^2+12x^2 \quad C=0 \\ x^2+8x^2 &= Ax^2+12x^2 \quad D=0 \\ x^2 &= A^2x^2 \quad B=0 \\ 1 &= A^2 \end{aligned}$$

$$\begin{aligned} \textcircled{4} & \quad \frac{4}{5x^2} + \frac{17}{(5x^2)^2} \\ \textcircled{5} & \quad \frac{-3x+2}{x+1} - \frac{2}{x-1} \\ \textcircled{8} & \quad \frac{3x}{x+2} + \frac{-3x}{(x+2)^2} \end{aligned}$$

$$\begin{aligned} -x^2+5x &= \frac{A(x^n)}{x-1} + \frac{Bx+C(x-1)}{x^2+1} \\ 5x(x-1) &= Ax^n + Bx^2 + Cx - C \\ (x-1)(x+1) &= Ax^n + Bx^2 + Cx - C \\ x^2-1 &= Ax^n + Bx^2 + Cx - C \\ x^2-1 &= Ax^2 + Bx^2 \quad -1=B \\ 5x &= -Bx \quad 5=-B \\ Q=A-C &= 0 \quad A=C \\ -1-B &= -1-A-B \\ 0=2-B &= -1-A-B \\ -2=-B &= -1-A-B \\ C=2 &= -1-A-B \end{aligned}$$

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**Try this:** Find the area of the triangle whose vertices are  $(-2, 8)$ ,  $(6, 2)$  and  $(-2, 2)$



$$A = \frac{1}{2} h b$$
$$\frac{1}{2}(6)(8)$$

**Area of a Triangle Given the Vertices**  
Given Vertices:  $(x_1, y_1)$ ,  $(x_2, y_2)$ ,  $(x_3, y_3)$

*\* Area =  $\pm \frac{1}{2}$  determinant*

*Area =  $\pm \frac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$*

*ximinant* *determinant*

to the matrix as set up above.

**Matrix  $\rightarrow$  math  $\rightarrow$  enter**

age write:  $Area = \pm \frac{1}{2} (\pm \#)$

*\* Area is positive*

- Procedure  $A = \pm \frac{1}{2} \text{determinant}$

1) MUST write the equation.

2) Substitute in the vertices into the matrix as set up above.

3) Find the determinant of #1 **Matrix**  $\rightarrow$  **math**  $\rightarrow$  **enter**

4) Using the appropriate signage write:  $\text{Area} = \pm \frac{1}{2} (\pm \#)$

5) Write the final answer!

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Example #1: Find the area of the triangle whose vertices are given. (-2,8), (6, 2), (-2, 2)

$$A = \pm \frac{1}{2} \text{ determinant}$$
$$A = \pm \frac{1}{2} \begin{vmatrix} -2 & 8 \\ 6 & 2 \\ -2 & 2 \end{vmatrix} = \frac{1}{2}(-48) \boxed{-24}$$

Example #2: Find the area of the triangle whose vertices are given. (5, -7), (-1, 4), (-5, -2)

$$A = \pm \frac{1}{2} \det$$
$$A = \pm \frac{1}{2} \begin{vmatrix} 5 & -7 \\ -1 & 4 \\ -5 & -2 \end{vmatrix}$$

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