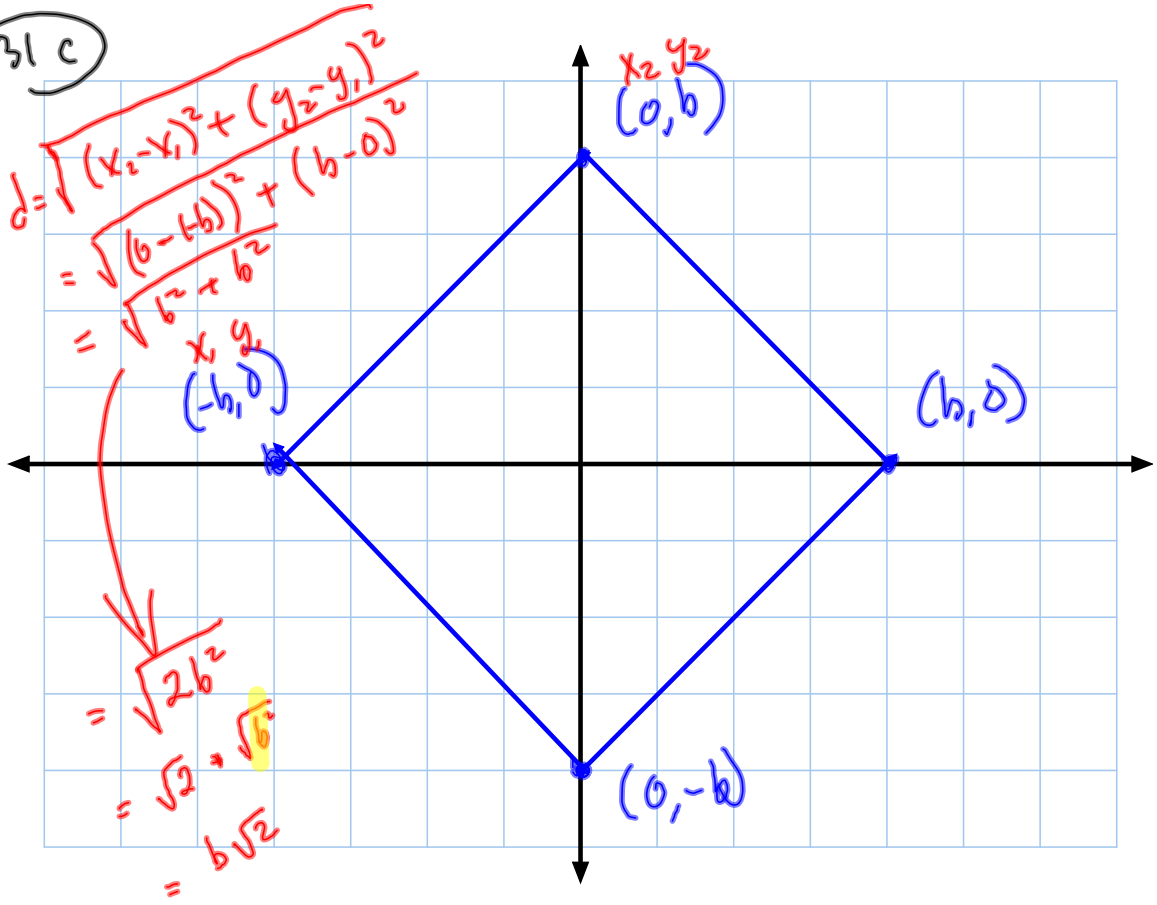
31 C




$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$= \sqrt{(b-(-b))^2 + (b-0)^2}$

$= \sqrt{b^2 + b^2}$

$= \sqrt{2b^2}$

$= \sqrt{2} \cdot \sqrt{b^2}$

$= b\sqrt{2}$

40 $A(p, p+2)$ $B(r, s)$ $C(3p, 3b)$

$m_{AC} \stackrel{?}{=} 1 - \frac{1}{p}$

$\frac{2p-2}{2p} \stackrel{?}{=} 1 - \frac{1}{p}$

$\frac{p-1}{p} \stackrel{?}{=} 1 - \frac{1}{p}$

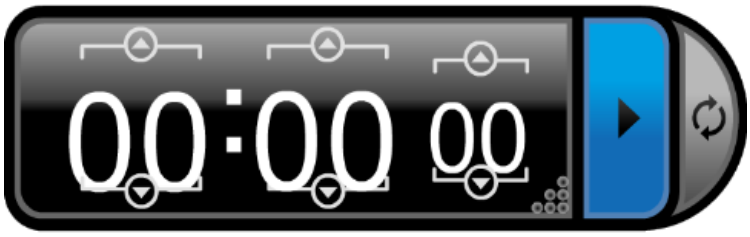
$=$

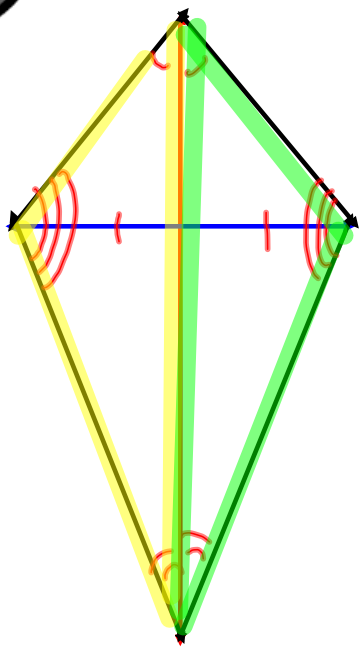
$1 - \frac{1}{p} = \frac{p}{p} - \frac{1}{p}$

$= \frac{p-1}{p}$

$\frac{p-1}{p} = \frac{p}{p} - \frac{1}{p}$

$= 1 - \frac{1}{p}$



# Coordinate proofs

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Using the coordinate system to prove something.

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- So we use points with ***variables rather than specific numbers***.

# Coordinate proofs

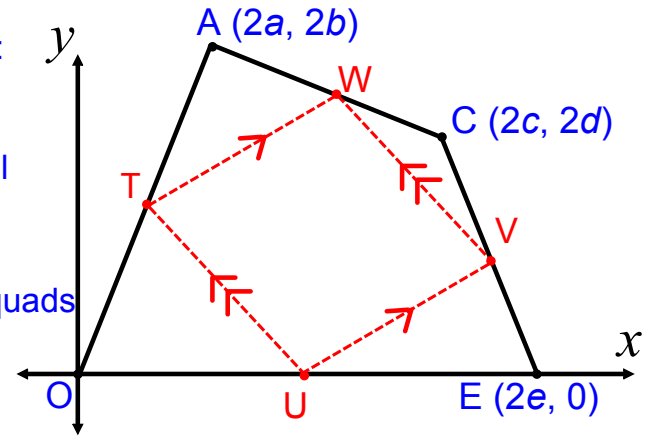
Using the coordinate system to prove something.

- When we prove something, we need to do it for the general case...
- If we work with specific cases, we're just playing with inductive reasoning...

  ...we can't prove anything true using inductive reasoning.
- So we use points with ***variables rather than specific numbers***.

- Yesterday's exercise is an example:
  - *ACEO* is a quadrilateral
  - It is **NOT** a specific quadrilateral
  - It could be **ANY** quadrilateral

  ∴ what we proved is true for **ALL** quads




# Coordinate proofs guidelines

How can we place our shape on the coordinate graph and make our work a lot easier?

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Coordinates...

# Coordinate proofs guidelines

How can we place our shape on the coordinate graph and make our work a lot easier?

## Positioning...

- Center figure on the origin if it is regular

*... or ...*

- Place a vertex at the origin, side(s) on the axis

## Coordinates...

# Coordinate proofs guidelines

How can we place our shape on the coordinate graph and make our work a lot easier?

## Positioning...

- Center figure on the origin if it is regular

*... or ...*

- Place a vertex at the origin, side(s) on the axis

## Coordinates...

- Use coords that are multiples of 2 (especially if finding midpts)

## Coordinate proof

Given: $\overline{MN}$ is midseg of Trapezoid *TRAP*

Prove: $\overline{MN} \parallel \overline{RA}$ and $\overline{MN} \parallel \overline{TP}$

$MN = {}^1/_2 (RA + TP)$

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Draw and label the figure...

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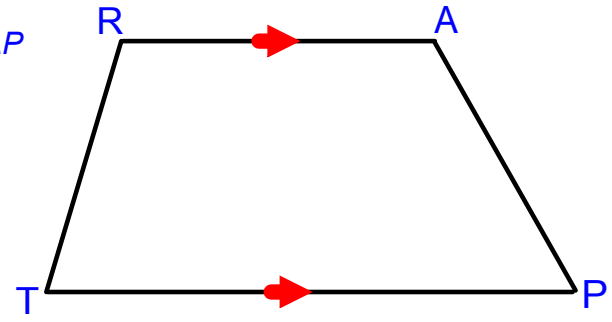


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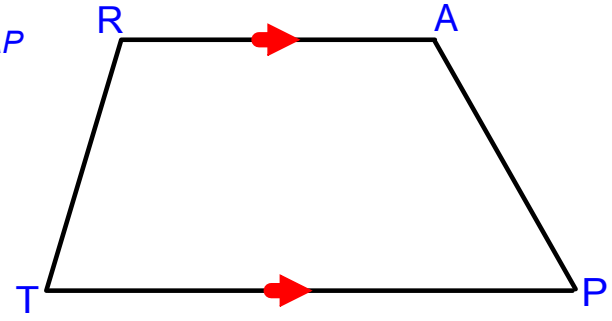
...the midseg too...



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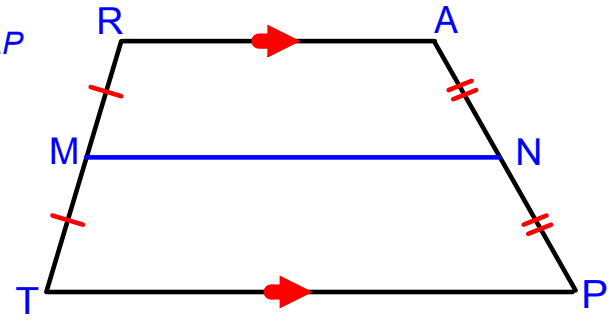


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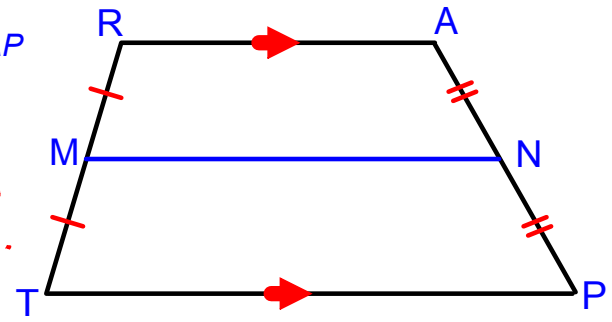
...give the vertices easy coords to work with...



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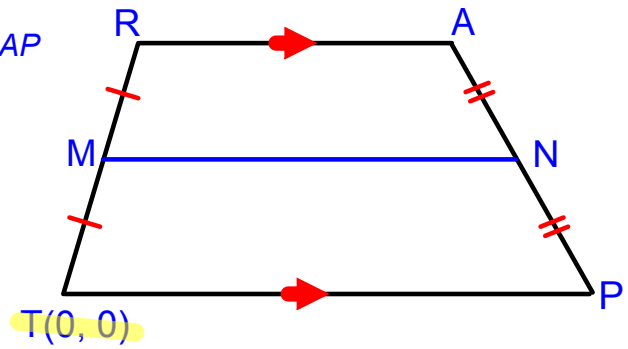


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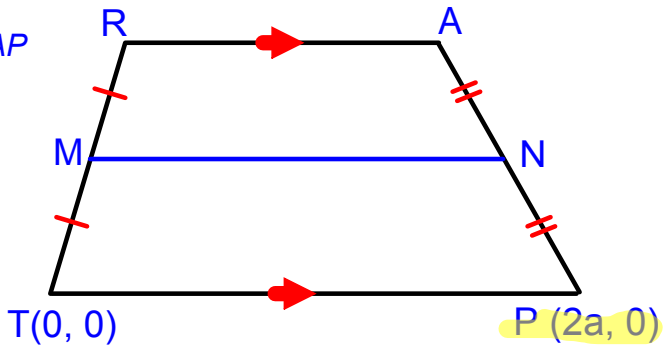

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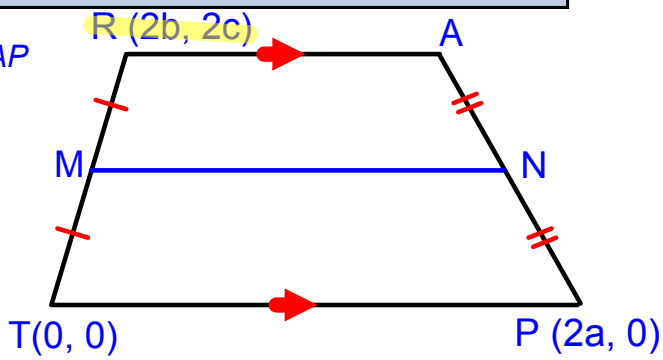


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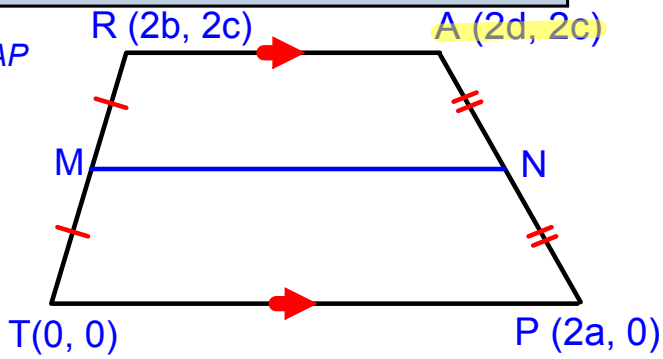

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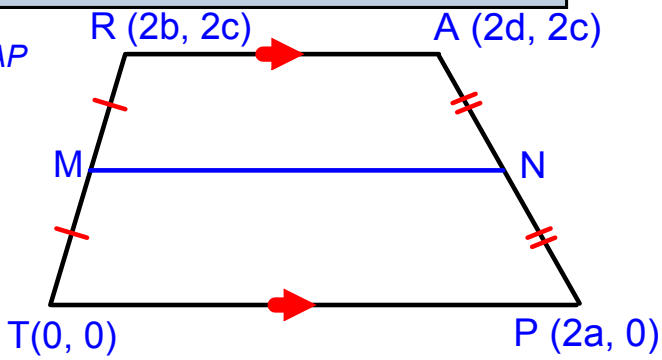


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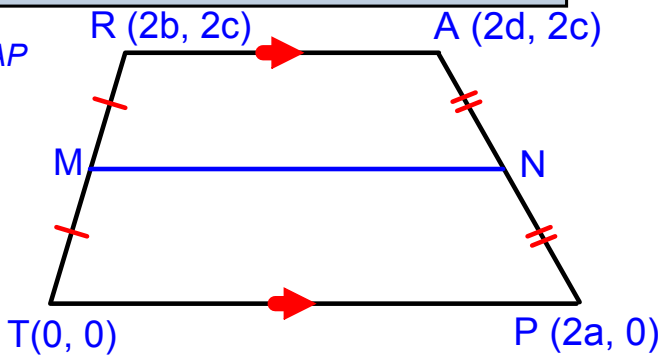
Determine coords of the midseg



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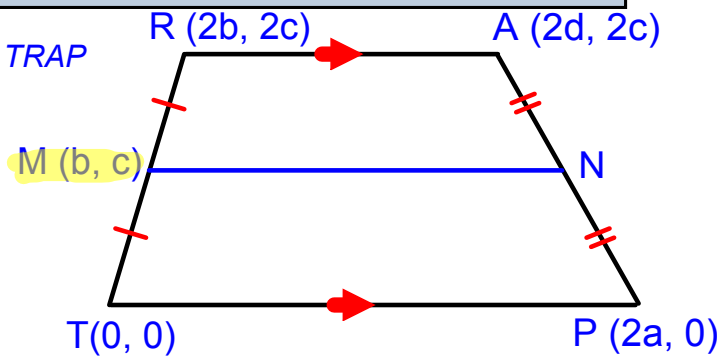


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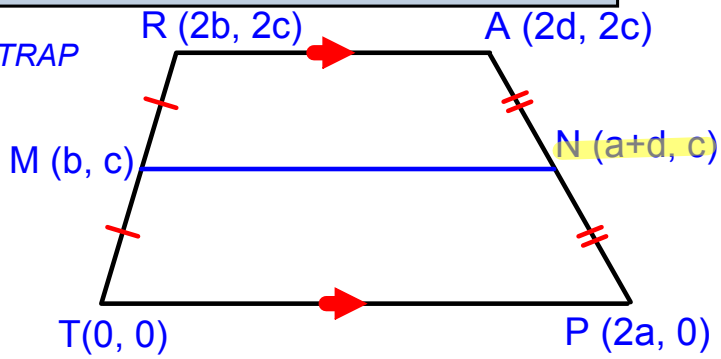

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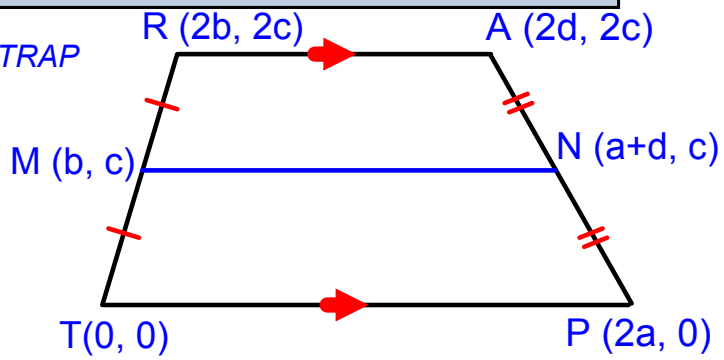


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Prove: $\overline{MN} \parallel \overline{RA}$ and $\overline{MN} \parallel \overline{TP}$

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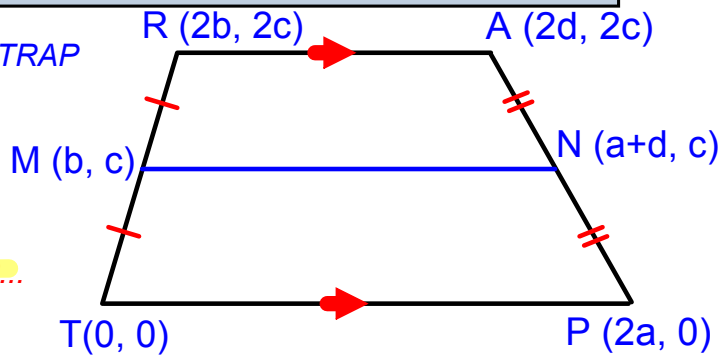
*Determine slope of MN, RA & TP...*



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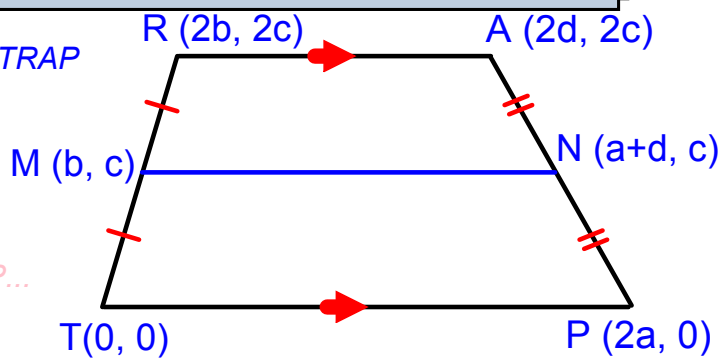



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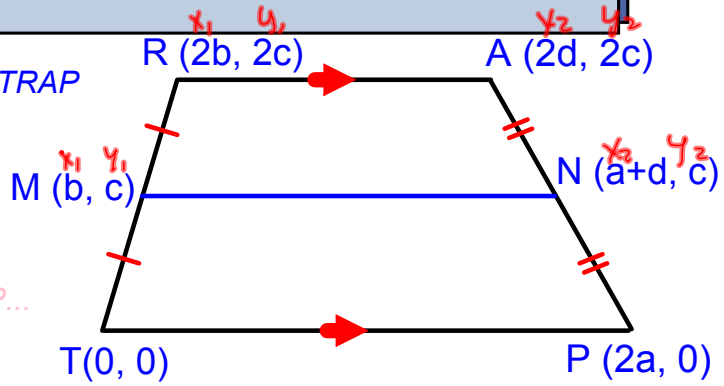


*Determine length of MN, RA & TP...*

$TP = 2a$

$RA = \sqrt{(2d-2b)^2 + (2c-2c)^2}$

$= \sqrt{(2d-2b)^2} = 2d-2b$

$MN = \sqrt{(a+d-b)^2 + (c-c)^2}$

$= \sqrt{(a+d-b)^2}$

$= a+d-b$

$= d-b+a$

$\frac{1}{2}(RA + TP) = \frac{1}{2}(2d-2b+2a)$

$= d-b+a$

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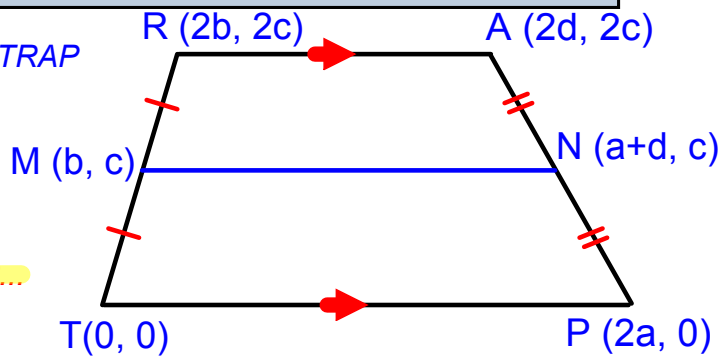


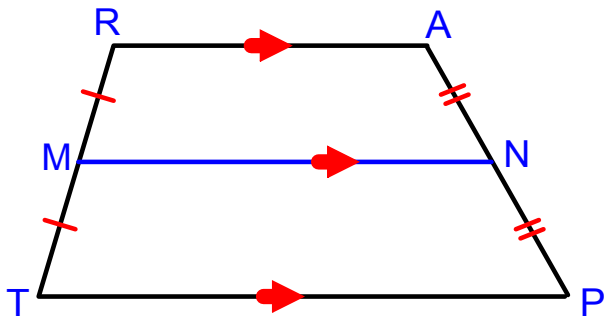

*Determine slope of MN, RA & TP...*

*Determine length of MN, RA & TP...*

# Theorem 6-18: Trapezoid Midseg Thm

1) Midseg of trapezoid is II to both bases ... $\overline{MN} \parallel \overline{RA}$ and $\overline{MN} \parallel \overline{TP}$

2) Length of midseg is half sum base lengths ... $MN = {}^1/_2\,(RA + TP)$



## Some Algebra review...

Common error :

$$\frac{3x+4}{2}$$

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$$\frac{3x+4}{2} = \frac{3x+\cancel{4}^{2}}{\cancel{2}_{1}}$$

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Can only cancel if it is common to all terms in the numerator.

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Common error :

$$\frac{3x+4}{2} = \frac{3x+\cancel{4}^{2}}{\cancel{2}_{1}}$$

Can not cancel any thing here ...

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$$\frac{3x+4}{2} = \frac{3x+\cancel{4}^{2}}{\cancel{2}_{1}}$$

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Can not cancel any thing here ... why?

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Can not cancel any thing here ... why?

because one of the terms in the numerator isn't ÷ by 2.

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The right way :

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factor the common 3 out of ea part of the numerator

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$$\frac{3x+27}{9} = \frac{3(x+9)}{9}$$

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factor the common 3 out of ea part of the numerator

now can cancel the common 3.


## Some Algebra review...

The right way:


$$\frac{3x+27}{9} = \frac{3(x+9)}{9} = \frac{\cancel{3}^{1}(x+9)}{\cancel{9}_{3}}$$


factor the common 3 out of ea part of the numerator

now can cancel the common 3.

## Some Algebra review...

The right way:

$$\frac{3x+27}{9} = \frac{3(x+9)}{9} = \frac{\cancel{3}^{1}(x+9)}{\cancel{9}3} = \frac{x+9}{3}$$

factor the common 3 out of ea part of the numerator

now can cancel the common 3.

## Some Algebra review...

$$\frac{x-3}{x}$$

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$$\frac{x-3}{x}$$

one fraction

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one fraction

difference of 2 fractions w/ common denominators

## Some Algebra review...

$$\frac{x-3}{x} > \frac{x-3}{x}$$

one fraction

difference of 2 fractions w/ common denominators

## Some Algebra review...

$$\frac{x-3}{x} > \frac{x-3}{x} = \frac{x}{x} - \frac{3}{x}$$

one fraction

difference of 2 fractions w/ common denominators

# Some Algebra review...

$$\frac{x-3}{x} = \frac{x}{x} - \frac{3}{x} = 1 - \frac{3}{x}$$

simplified.

one fraction

difference of 2 fractions w/ common denominators

$a^2 - b^2$

$\sqrt{(a-b)^2} = (a-b)(a-b) = a^2 - ab - ab + b^2$

$= \sqrt{a^2 - 2ab + b^2}$

First
Outside
Inside
Last
FOIL

① $\sqrt{a^2 - b^2} \stackrel{?}{=} a - b$ ← NO

② $\sqrt{a^2 b^2} \stackrel{?}{=} ab$ ← yes

$\sqrt{ab \cdot ab}$

NOT Equal

$a^2 - b^2 = (a-b)(a+b)$ FOIL

③ $\sqrt{(a-b)^2} \stackrel{?}{=} a - b$ ← yes

$\sqrt{x^2} = x$

$\sqrt{(a-b)^2} = \sqrt{a^2 - 2ab + b^2} = a - b$

FOIL out $(a-b)^2$

# L6-7 HW Problems

L6-7 Pg 333 #1-3, 5, 6, 9, 25, 26, 30, 31, 42-44

Extra Credit Worksheet (available online)