

Prerequisite Skills (Review)

Section 1.0 A

EQ: How are algebraic evaluating and solving related to finding midpoint values and location?

Vocabulary:

absolute value

The distance between 2 points, always positive

substitution

Replacing an expression with a different expression or value

solving linear equations

Isolating the variable

midpoint

The point in the middle of 2 pts.

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

A1. Evaluate the expression

Solve

a. $|7 - 11| = | -4 | = 4$
 b. $|5 + 12| = |17| = 17$
 c. $-2|51 - 100| = -2|-49| = -2(49) = -98$
 d. $|-18 - 7| = |-18 + -7| = |-25| = 25$

A2. Evaluate the expression when $x = -2$ and $y = 5$.

solve

a. $5x = 5(-2) = -10$
 b. $30 + -xy = 30 + -(-2)(5) = 30 + 10 = 40$
 c. $10x^2y^2 = 10(-2)^2(5)^2 = 10(4)(25) = 1000$
 d. $50 - 4x + 3y = 50 - 4(-2) + 3(5) = 50 + 8 + 15 = 73$



A3. Solve the linear equation.

a. $510 = -3w$
 $\frac{510}{-3} = \frac{-3w}{-3}$
 $w = \frac{510}{-3}$
 $w = -170$

b. $7v - 32 + 4v = 45$
 $11v - 32 = 45$
 $+32 \quad +32$
 $11v = 77$
 $\frac{11v}{11} = \frac{77}{11}$
 $v = 7$

c. $9 - h = 6h + 107$
 $+h \quad +h$
 $9 = 7h + 107$
 $-107 \quad -107$
 $-98 = 7h$
 $\frac{-98}{7} = \frac{7h}{7}$
 $h = -14$

A4. Find the **midpoint** of the **segment** with the given **endpoints**:

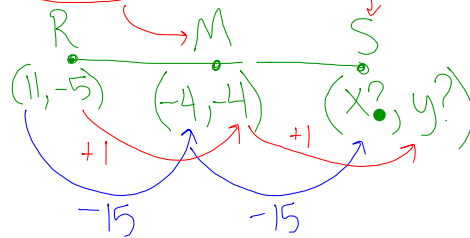
- a. $S(4, -1)$ and $T(6, 0)$  b. $G(-2, -8)$ and $H(-3, -12)$ 

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\left(\frac{4+6}{2}, \frac{-1+0}{2} \right) = \left(\frac{10}{2}, \frac{-1}{2} \right) = \left(5, -\frac{1}{2} \right)$$

$$\left(\frac{-2+(-3)}{2}, \frac{-8+(-12)}{2} \right) = \left(\frac{-5}{2}, \frac{-20}{2} \right) = \left(-\frac{5}{2}, -10 \right)$$

A5. Find the coordinates of **endpoint S** of \overline{RS} if $R(11, -5)$ and the **midpoint** of \overline{RS} is $(-4, -4)$.



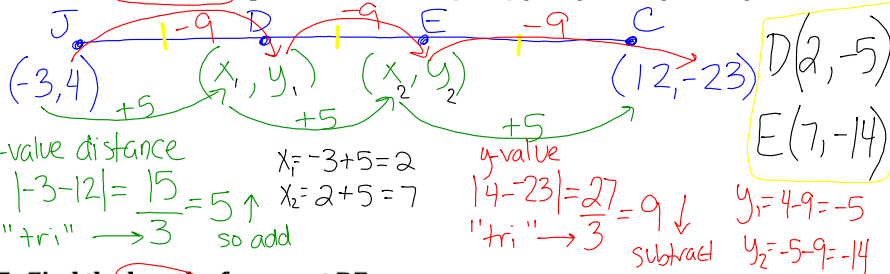
$$x = -4 - 15 = -19$$

$$y = -4 + 1 = -3$$

$$\boxed{(-19, -3)}$$

x value distance = $|11 - (-4)| = 15$ * moving ↓ so subtract
 y value distance = $|-5 - (-4)| = 1$ * moving ↑ so add

A6. Find the **tri-section** points, **D** and **E**, of \overline{JC} if $J(-3, 4)$ and $C(12, -23)$.



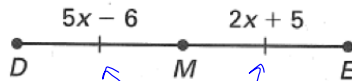
x-value distance $| -3 - 12 | = 15 = 5 \times 3$
 "tri" → 3 so add
 $x_1 = -3 + 5 = 2$
 $x_2 = 2 + 5 = 7$

y-value $| 4 - (-23) | = 27 = 9 \times 3$
 "tri" → 3 subtract
 $y_1 = 4 - 9 = -5$
 $y_2 = -5 - 9 = -14$

$$\boxed{D(2, -5)}$$

$$\boxed{E(7, -14)}$$

A7. Find the **length** of segment **DE**.



$$DM = ME$$

$$5x - 6 = 2x + 5$$

$$-2x + 6 \quad | \quad -2x + 6$$

$$3x = 11$$

$$x = \frac{11}{3}$$

$$DM = 5x - 6 = 5\left(\frac{11}{3}\right) - 6 = \frac{55}{3} - \frac{18}{3} = \frac{37}{3}$$

Tick marks represent = length
 ∴ M is midpoint

$$DM + ME = \frac{37}{3} + \frac{37}{3} = \frac{74}{3} = DE$$

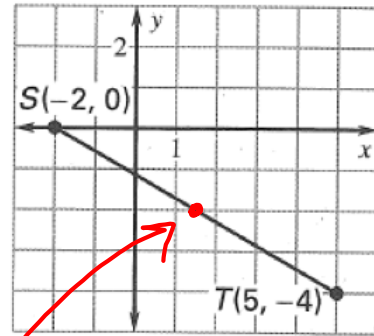
A8. Find the midpoint of \overline{TS} .

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\left(\frac{-2 + 5}{2}, \frac{0 + -4}{2} \right)$$

$$\left(\frac{3}{2}, -\frac{4}{2} \right)$$

$$\left(\frac{3}{2}, -2 \right) \text{ OR } (1.5, -2)$$



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1.0A Summary:

To find the midpoint you have to substitute values in for x_1 , x_2 , y_1 and y_2 . Then you evaluate/solve the expression.

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

* Add
then
÷ 2