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1. Evaluate the following, showing all steps.

(a) $3 + (-12) + (-5) - 2(-8)$
 $= 3 - 12 - 5 + 16$
 $= 19 - 17$
 $= 2$

(b) $1\frac{2}{3} - \frac{5}{6}$
 $= \frac{5}{3} - \frac{5}{6}$
 $= \frac{10}{6} - \frac{5}{6}$
 $= \frac{5}{6}$

(c) $\left(\frac{-4}{9}\right) + \left(\frac{-10}{27}\right)$
 $= \frac{-4}{9} + \frac{-10}{27}$
 $= \frac{-12}{27} + \frac{-10}{27}$
 $= \frac{-22}{27}$

(d) $[(-11-5)(-2) - 2] - \left[-10 - \left(\frac{8}{8}\right) \times \left(\frac{15}{8}\right)\right]$
 $= [(-16)(-2) - 2] - [-10 - 1.875]$
 $= (32 - 2) - (-11.875)$
 $= 30 + 11.875$
 $= 41.875$

(e) $\tan\left(\frac{\frac{2}{3} \text{ of } 30 - (35)(-2)}{10 + 16 + (-2)}\right)$
 $= \tan\left(\frac{\frac{2}{3} \times 30 + 70}{10 - 8}\right)$
 $= \tan\left(\frac{20 + 70}{2}\right)$
 $= \tan(45^\circ)$
 $= 1$

2. Expand and/or simplify:

(a) $3x - 4y + 3x + 7y - 12x$
 $= -6x + 3y$

(b) $7p^2q - (-2pq) + (-8p^2q) - 4pq^2 + 10pq - (-7pq^2)$
 $= 7p^2q + 2pq - 8p^2q - 4pq^2 + 10pq + 7pq^2$
 $= -p^2q + 12pq + 3pq^2$

(c) $3(m^2 - 4m + 4) - (2m^2 - 5m + 12)$
 $= 3m^2 - 12m + 12 - 2m^2 + 5m - 12$
 $= m^2 - 7m$

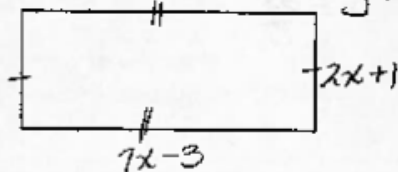
(d) $(2x - 3)(4x + 1)$
 $= 8x^2 + 2x - 12x - 3$
 $= 8x^2 - 10x - 3$

(e) $3(x - 2y)^2$
 $= 3(x^2 - 4xy + 4y^2)$
 $= 3x^2 - 12xy + 12y^2$

3. For the rectangle on the right,

(a) find an expression that represents how much longer the length is than the width.

$l - w = (7x - 3) - (2x + 1)$
 $= 7x - 3 - 2x - 1$
 $= 5x - 4$



(b) find an expression that represents the area of the rectangle

$A = lw = (7x - 3)(2x + 1)$
 $= 14x^2 + 7x - 6x - 3$
 $= 14x^2 + x - 3$

(c) find the area of the rectangle if $k = 2$ cm.

$A = 14(2)^2 + 2 - 3$
 $= 14(4) + 2 - 3$
 $= 56 + 2 - 3$
 $= 55 \text{ cm}^2$

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5. Solve the following equations. Check the answer in (b).

(a) $2x = 6x + 60$

$$2x - 6x = 60 \checkmark$$

$$-4x = 60 \checkmark$$

$$x = -15 \checkmark \quad 2$$

(c) $\left(\frac{2x}{y}\right) - (2) = \frac{x+1}{2}$

$$4x - 12 = 3x + 3 \checkmark$$

$$4x - 3x = 3 + 12 \checkmark$$

$$x = 15 \checkmark \quad 4$$

(b) $8(a+2) - 6 = 3 + a$

$$8a + 16 - 6 = 3 + a \checkmark$$

$$8a + 10 = 3 + a \checkmark$$

$$8a - a = 3 - 10 \checkmark$$

$$7a = -7 \checkmark$$

$$a = -1 \checkmark$$

LS	RS
$8(a+2) - 6$	$3 + a$
$= 8(-1+2) - 6$	$= 3 - 1$
$= 8(1) - 6$	$= 2 \checkmark$
$= 8 - 6 \checkmark$	
$= 2$	LS = RS

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6. Given the formula $A = \frac{h}{2}(a+b)$, find the value of "b" if $A = 20\text{cm}$, $h = 4\text{cm}$, and $a = 6\text{cm}$.

$$20 = \frac{4}{2}(6+b) \checkmark$$

$$20 = 2(6+b) \checkmark$$

$$20 = 12 + 2b \checkmark$$

$$20 - 12 = 2b \checkmark$$

$$8 = 2b \checkmark$$

$$b = 4 \text{ cm} \quad 4$$

7. Write the ratios in lowest terms: (a) 15 : 10 : 5

$$= 3 : 2 : 1 \checkmark$$

(b) 3km to 200m

$$= \frac{3000}{200} : 2000 \checkmark$$

$$= 15 : 1 \checkmark \quad 3$$

8. Solve the following proportions for the indicated unknown(s) using cross multiplication.

(a) $\frac{x}{4} = \frac{7}{5}$

$$5x = 28 \checkmark$$

$$x = 5.6 \checkmark \quad 2$$

$$\text{or } x = \frac{28}{5}$$

(b) $\frac{x}{24} = \frac{-1}{4} = \frac{y}{-3}$

$$4x = -24 \checkmark \quad 4y = 3 \checkmark$$

$$x = -6 \checkmark \quad y = \frac{3}{4} \checkmark \quad 4$$

9. (a) In a punch, the ratio of Sprite to fruit juice is 3 : 2. If 1.5L of fruit juice is used, how much Sprite is in the punch? Show your work.

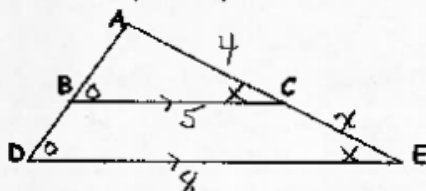
$$\frac{\text{Sprite}}{\text{F.J}} \Rightarrow \frac{3}{2} = \frac{x}{1.5} \checkmark$$

$$2x = 4.5 \checkmark$$

$$x = 2.25$$

3 \therefore The punch needs 2.25 L of Sprite

(b) Explain why $\triangle ABC$ is similar to $\triangle ADE$ and find the value of x.



$\angle ABC = \angle D$
 $\angle ACB = \angle E$ Corr \angle s or F pattern \checkmark

$\therefore \triangle ABC \sim \triangle ADE$ (AA) \checkmark

$$\therefore \frac{AC}{AE} = \frac{BC}{DE}$$

$$\frac{4}{x+4} = \frac{5}{8} \checkmark$$

$$5x + 20 = 32$$

$$5x = 32 - 20$$

$$5x = 12 \checkmark$$

$$\rightarrow x = 2.4$$

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