

MPM2DO**Review Solving Equations Part A**

Solve for 'x' in each equation.

Show a full solution and underline your final answer.

Use lined paper.

Knowledge questions

1. $2x - 5 = 13$
2. $3x + 2 = 8x + 12$
3. $10 - 4x = 7x + 21$
4. $3(x + 2) = 15$
5. $\frac{2}{3}x = 8$
6. $\frac{1}{2}x + \frac{3}{5} = \frac{3}{4}x - 2$

Thinking questions

1. $2(5x - 3) + 3 = 3 - 2(x - 3)$
2. $4x - 3 - 2(x + 5) = 5 - 7x - 3$
3. $\frac{4x + 3}{5} - \frac{x - 3}{2} = 6$
4. $\frac{2}{3}(3x - 1) + 2 = \frac{1}{4}(x + 1)$

Application Problems

Use a variable and an equation to solve.

Don't forget to write a sentence for your final answer.

1. The price of a movie ticket today is **\$12.50**. This is **\$4.25 more** than **eleven times** the price for a ticket in the early 1970's when Mr. Biss was a teenager. Determine how much Mr. Biss had to pay for one ticket way back then to go to the movies.
2. Jacob, Tristan and Jonathan decide to buy Mr. Biss a pre-end of the course gift. Tristan is chipping in \$200 less than three times what Jacob is contributing. Jonathan is chipping in twice as much as Tristan. Altogether they come up with \$640 for the gift.

How much each of them contribute for the gift?

Solve for 'x' in each equation. **Answers could be fractions.**
 Show a solution and underline your final answer.
 Use lined paper.

Knowledge

1. $5x + 3 = 18$
2. $4x - 2 = 7x + 1$
3. $9 + 7x - 3x = 2x + 3 - x$
4. $8(x - 2) = 4x + 20$
5. $\frac{3}{4}x = 9$
6. $\frac{1}{3}x + \frac{2}{5} = \frac{3}{10}x - 1$

Thinking

1. $2x - (3x + 4) = 6 + 2(3x - 2) + 8x + 3$
2. $\frac{3x}{7} - x = \frac{5}{14}$
3. $\frac{(2x-1)}{2} - \frac{(x-3)}{4} = \frac{(5-3x)}{8}$
4. $\frac{1}{2}(x+3) + \frac{3}{4}(2x+3) = \frac{7}{8}$

Application Word Problems

Solve the following word problems using an algebraic solution involving an equation. Make sure that you write a final statement.

1. Two consecutive numbers have a sum of 73. Determine the numbers.
2. Julia, Patricia and ^{Sarah}~~Emma~~ decide to buy an ipod that they will give to Mr. B as a goodbye gift. Julia contributes \$25 more than Patricia. Sarah contributes three times as much as Julia. How much does each person contribute if the cost of the ipod is \$450 ?

Application Re-arranging formulas 3 marks each (/ 6)

Re-arrange each formula as directed.

1. $D = 1 + RT$ into $R =$
2. $g = vt^2$ into $t =$

SOLVING EQUATIONS REVIEW PART A

Knowledge Questions

1. $2x - 5 = 13$

$$2x = 13 + 5$$

$$2x = 18$$

$$x = 18/2$$

$$\underline{x = 9}$$

2. $3x + 2 = 8x + 12$

$$3x - 8x + 2 = 12$$

$$-5x + 2 = 12$$

$$-5x = 12 - 2$$

$$-5x = 10$$

$$x = \frac{10}{-5}$$

$$\underline{x = -2}$$

3. $\frac{2}{3}x = 8$

$$3\left(\frac{2}{3}\right)x = 8(3)$$

$$2x = 24$$

$$x = \frac{24}{2}$$

$$\underline{x = 12}$$

4. $3(x+2) = 15$

$$3x + 6 = 15$$

$$3x = 15 - 6$$

$$3x = 9$$

$$x = 9/3$$

$$\underline{x = 3}$$

5. $10 - 4x = 7x + 21$

$$10 - 4x - 7x = 21$$

$$-11x = 21$$

$$-11x = 21 - 10$$

$$-11x = 11$$

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

$$\underline{x = -1}$$

6. $\frac{1}{2}x + \frac{3}{5} = \frac{3}{4}x - 2$

$$10\left(\frac{1}{2}\right)x + 4\left(\frac{3}{5}\right) = 10\left(\frac{3}{4}\right)x - 20(2)$$

$$10x + 4(3) = 5(3x) - 40$$

$$10x + 12 = 15x - 40$$

$$10x - 15x + 12 = -40$$

$$-5x + 12 = -40$$

$$-5x = -40 - 12$$

$$-5x = -52$$

$$\frac{-5x}{-5} = \frac{-52}{-5}$$

$$x = 52/5 \text{ or } 10\frac{2}{5}$$

Thinking Questions

$$\boxed{1} \quad 2(5x-3) + 3 = 3 - 2(x-3)$$

$$10x - 6 + 3 = 3 - 2x + 6$$

$$10x - 3 = 9 - 2x$$

$$10x + 2x - 3 = 9$$

$$12x - 3 = 9$$

$$12x = 9 + 3$$

$$12x = 12$$

$$x = 12/12$$

$$\underline{x = 1}$$

$$\boxed{2} \quad 4x - 3 - 2(x+5) = 5 - 7x - 3$$

$$4x - 3 - 2x - 10 = 2 - 7x$$

$$2x - 13 = 2 - 7x$$

$$2x + 7x - 13 = 2$$

$$9x - 13 = 2$$

$$9x = 2 + 13$$

$$9x = 15$$

$$x = 15/9$$

$$\underline{x = 5/3}$$

$$\boxed{3} \quad \frac{4x+3}{5} - \frac{x-3}{2} = 6$$

$$^2 \cancel{10} \left(\frac{4x+3}{\cancel{5}} \right) - ^5 \cancel{10} \left(\frac{x-3}{\cancel{2}} \right) = 10(6)$$

$$2(4x+3) - 5(x-3) = 60$$

$$8x + 6 - 5x + 15 = 60$$

$$3x + 21 = 60$$

$$3x = 60 - 21$$

$$3x = 39$$

$$x = 39/3$$

$$\underline{x = 13}$$

$$\boxed{4} \quad \frac{2}{3}(3x-1) + 2 = \frac{1}{4}(x+1)$$

$$^4 \cancel{12} \left(\frac{2}{\cancel{3}} \right) (3x-1) + ^4 \cancel{12} (2) = ^3 \cancel{12} \left(\frac{1}{\cancel{4}} \right) (x+1)$$

$$8(3x-1) + 24 = 3(x+1)$$

$$24x - 8 + 24 = 3x + 3$$

$$24x + 16 = 3x + 3$$

$$24x - 3x + 16 = 3$$

$$21x + 16 = 3$$

$$21x = 3 - 16$$

$$21x = -13$$

$$\underline{x = \frac{-13}{21}}$$

Application Problem (5 marks each)

1) let 'p' represent the price of a ticket from the early 70s. ✓

$$11p + 4.25 = 12.50 \quad \checkmark$$

$$11p = 12.50 - 4.25$$

$$11p = 8.25 \quad \checkmark$$

$$p = \frac{8.25}{11}$$

$$p = 0.75 \quad \checkmark$$

∴ The price of a movie ticket from the early 70s was \$0.75.

2) let 'x' represent the amount Jacob chips in for the gift.

let $2(3x - 200)$ represent Jonathan's contribution.

let $3x - 200$ represent Tristan's effort.

$$3x - 200 + 2(3x - 200) + x = 640$$

$$3x - 200 + 6x - 400 + x = 640$$

$$10x - 600 = 640$$

$$10x = 640 + 600$$

$$10x = 1240$$

$$x = \underline{\underline{\$124}}$$

$$\begin{aligned} \text{Tristan} &= 3(124) - 200 \\ &= 372 - 200 \\ &= 172 \end{aligned}$$

$$\begin{aligned} \text{Jonathan} &= 2 \times 172 \\ &= 344 \end{aligned}$$

Jacob chips in \$124,

Tristan chips in \$172 and

Jonathan chips in \$344.

$$\begin{aligned} \text{Check } 124 + 172 + 344 \\ = 640 \quad \checkmark \end{aligned}$$

SOLVING EQUATIONS REVIEW PART B

Knowledge

$$(1) 5x + 3 = 18$$

$$5x + 3 - 3 = 18 - 3$$

$$5x = 15$$

$$x = \frac{15}{5}$$

$$\therefore \underline{x = 3}$$

$$(2) 4x - 2 = 7x + 1$$

$$4x - 2 + 2 = 7x + 1 + 2$$

$$4x = 7x + 3$$

$$4x - 7x = 7x - 7x + 3$$

$$-3x = 3$$

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

$$\therefore \underline{x = -1}$$

$$(3) 9 + 7x - 3x = 2x + 3 - x$$

$$9 + 4x = x + 3$$

$$9 - 9 + 4x = x + 3 - 9$$

$$4x = x - 6$$

$$4x - x = x - x - 6$$

$$3x = -6$$

$$x = -6/3$$

$$\therefore \underline{x = -2}$$

$$(4) 8(x - 2) = 4x + 20$$

$$8x - 16 = 4x + 20$$

$$8x - 16 + 16 = 4x + 20 + 16$$

$$8x = 4x + 36$$

$$8x - 4x = 4x - 4x + 36$$

$$4x = 36$$

$$x = 36/4$$

$$\therefore \underline{x = 9}$$

$$(5) \frac{3}{4}x = 9$$

$$\frac{3}{4}x = \frac{9}{1}$$

$$\frac{3}{4}x = \frac{36}{4} \quad [\times 4]$$

$$3x = 36$$

$$x = 36/3$$

$$\therefore \underline{x = 12}$$

$$(6) \frac{1}{3}x + \frac{2}{5} = \frac{3}{10}x - 1 \quad \text{LCD is 30}$$

$$\frac{10}{10} \times \frac{1}{3}x + \frac{6}{6} \times \frac{2}{5} = \frac{3}{3} \times \frac{3}{10}x - \frac{30}{30} \times 1$$

$$\frac{10}{30}x + \frac{12}{30} = \frac{9}{30}x - \frac{30}{30} \quad [\times 30]$$

$$10x + 12 = 9x - 30$$

$$10x - 9x = -30 - 12$$

$$\underline{x = -42}$$

Thinking

$$\textcircled{1} \quad 2x - (3x+4) = 6 + 2(3x-2) + 8x + 3$$

$$2x - 3x - 4 = 6 + 6x - 4 + 8x + 3$$

$$-x - 4 = 14x + 5$$

$$-x - 4 + 4 = 14x + 5 + 4$$

$$-x = 14x + 9$$

$$-x - 14x = 14x - 14x + 9$$

$$-15x = 9$$

$$x = \frac{9}{-15} \quad \therefore x = \underline{\underline{-\frac{3}{5} \text{ or } -0.6}}$$

$$\textcircled{2} \quad \frac{3x}{7} - x = \frac{5}{14}$$

$$\frac{3x}{7} - \frac{x}{1} = \frac{5}{14}$$

$$\frac{2}{2} \times \frac{3x}{7} - \frac{14}{14} \times \frac{x}{1} = \frac{5}{14}$$

$$[\times 14] \quad \frac{6x}{14} - \frac{14x}{14} = \frac{5}{14}$$

$$6x - 14x = 5$$

$$-8x = 5$$

$$x = \underline{\underline{-\frac{5}{8}}}$$

$$\textcircled{3} \quad \frac{(2x-1)}{2} - \frac{(x-3)}{4} = \frac{(5-3x)}{8}$$

$$\frac{4(2x-1)}{4 \times 2} - \frac{2(x-3)}{2 \times 4} = \frac{(5-3x)}{8}$$

$$\frac{8x-4}{8} - \frac{2(x-3)}{8} = \frac{5-3x}{8} \quad [\times 8]$$

$$8x-4 - 2(x-3) = 5-3x$$

$$8x-4 - 2x+6 = 5-3x$$

$$6x+2 = 5-3x$$

$$6x+3x = 5-2$$

$$9x = 3$$

$$x = \frac{3}{9}$$

$$\therefore x = \underline{\underline{\frac{1}{3}}}$$

$$\textcircled{4} \quad \frac{1}{2}(x+3) + \frac{3}{4}(2x+3) = \frac{7}{8} \quad \text{L.C.D. is } 8$$

$$\frac{4}{4} \times \frac{1}{2}(x+3) + \frac{2}{2} \times \frac{3}{4}(2x+3) = \frac{7}{8}$$

$$\frac{4}{8}(x+3) + \frac{6}{8}(2x+3) = \frac{7}{8} \quad [\times 8]$$

$$4(x+3) + 6(2x+3) = 7$$

$$4x+12 + 12x+18 = 7$$

$$16x + 30 = 7$$

$$16x = 7-30$$

$$16x = -23$$

$$\therefore x = \underline{\underline{-\frac{23}{16} \text{ or } -1\frac{7}{16}}}$$

APPLICATIONS WORD PROBLEMS

① let x be one of the numbers. ✓
let $(x+1)$ be the other one. ✓

$$x + (x+1) = 73 \quad \checkmark$$

$$2x + 1 = 73$$

$$2x = 73 - 1$$

$$2x = 72 \quad \checkmark$$

$$x = 72/2$$

$$\therefore \underline{x = 36} \quad \checkmark$$

$$x+1 = 36+1$$

$$= \underline{37} \quad \checkmark$$

\therefore The two numbers are
36 and 37. ✓

② let Felicia's contribution be x . ✓

let Julian's " be $x+25$ ✓

let Sarah's " be $3(x+25)$ ✓

$$x + x+25 + 3(x+25) = 450 \quad \checkmark$$

$$2x+25 + 3x+75 = 450$$

$$5x + 100 = 450$$

$$5x = 450 - 100 \quad \checkmark$$

$$5x = 350$$

$$x = 350/5$$

$$\underline{x = 70} \text{ (Felicia)} \quad \checkmark$$

Julian

$$x+25 = 70+25 \\ = 95$$

Sarah

$$3(x+25) = 3(70+25) \quad \checkmark \\ = 3(95) \\ = 285$$

\therefore Felicia contributes \$70,
Julian \$95 and
Sarah \$285 for the iPad. ✓