

# Answers for Grade 9 Group Assignments - Quarter #4

Notes:

- Answers for group assignment problems that are out of the workbook can be found in the "G9 Workbook Answer Key".
- This answer key doesn't include all answers.

**Grade 9 – Week #25**

for Tuesday →

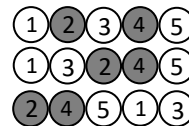
#2 Factoring  
 $x^2 + 10x = -21$   
 $x^2 + 10x + 21 = 0$   
 $(x+7)(x+3) = 0$   
 $x = -7, -3$

Completing the □.  
 $x^2 + 10x = -21$   
 $x^2 + 10x + 25 = -21 + 25$   
 $(x+5)^2 = 4$   
 $x+5 = \pm\sqrt{4}$   
 $x = -5 \pm 2$   
 $x = -5+2 \text{ or } -5-2$   
 $x = -3, -7$

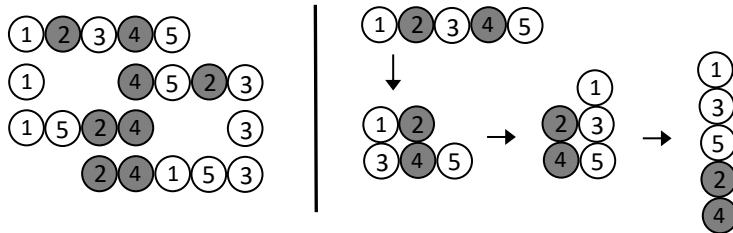
#3 Completing the □  
 $x^2 + 6x = 3$   
 $x^2 + 6x + 9 = 3 + 9$   
 $(x+3)^2 = 12$   
 $x+3 = \pm\sqrt{12}$   
 $x = -3 \pm 2\sqrt{3}$   
 $x \approx 0.464, -6.464$

for Thursday

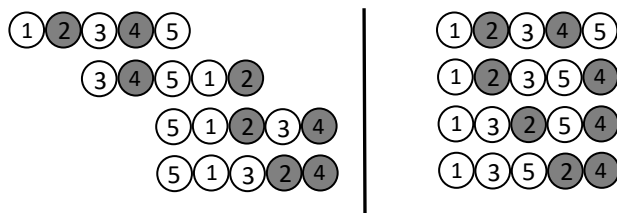
- 5 a) This can be done in two moves, assuming that "switching" is allowed (as shown here on the right) in the first move:



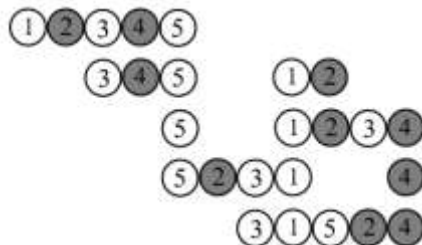
- b) Here are two solutions:



- c) Here are two solutions. (I believe at least one switch is necessary in order to do it in three moves.)



- d) In the first move, we leave a space for exactly two coins:



## Grade 9 – Week #26

for Thursday Group Work

Given  $x$ ,  $y$ , and  $z$  as the three numbers, the teacher's instructions simply translate to:

$$10(5(2x+5)+y-4)+3+z.$$

The student's final result ( $R$ ) is then equal to the above expression, which simplifies to:

$$R = 100x + 10y + z + 213$$

The teacher simply takes the student's result ( $R$ ), and subtracts 213, which gives the student's three original digits,  $x$ ,  $y$ , and  $z$ .

Individual Work

$$\textcircled{1} x^2 + 4x + 3 = 0$$

$$x^2 + 4x = -3$$

$$x^2 + 4x + 4 = -3 + 4$$

$$(x+2)^2 = 1$$

$$x+2 = \pm\sqrt{1}$$

$$x = -2 \pm 1$$

$$x = -2+1 \text{ or } -2-1$$

$$x = -1, -3$$

$$\textcircled{2} x^2 - 7x - 30 = 0$$

$$x^2 - 7x = 30$$

$$x^2 - 7x + \frac{49}{4} = 30 + \frac{49}{4}$$

$$\left(x - \frac{7}{2}\right)^2 = \frac{4 \cdot 30 + 49}{4}$$

$$\left(x - \frac{7}{2}\right)^2 = \frac{169}{4}$$

$$x - \frac{7}{2} = \pm\sqrt{\frac{169}{4}}$$

$$x = \frac{7}{2} \pm \frac{13}{2}$$

$$x = \frac{7}{2} + \frac{13}{2} \text{ or } \frac{7}{2} - \frac{13}{2}$$

$$x = \frac{20}{2}, -\frac{6}{2} \rightarrow x = 10, -3$$

$$\textcircled{3} 6x^2 - 19x + 15 = 0$$

$$x^2 - \frac{19}{6}x + \frac{15}{6} = 0$$

$$x^2 - \frac{19}{6}x + \frac{361}{144} = -\frac{15}{6} + \frac{361}{144}$$

$$\left(x - \frac{19}{12}\right)^2 = \frac{-24 \cdot 15}{24 \cdot 6} + \frac{361}{144}$$

$$\left(x - \frac{19}{12}\right)^2 = \frac{-360}{144} + \frac{361}{144}$$

$$\left(x - \frac{19}{12}\right)^2 = \frac{1}{144}$$

$$x - \frac{19}{12} = \pm\sqrt{\frac{1}{144}}$$

$$x = \frac{19}{12} \pm \frac{1}{12} \rightarrow x = \frac{20}{12}, \frac{18}{12}$$

$$x = \frac{5}{3}, \frac{3}{2}$$

## Grade 9 – Week #27

Individual Work

$$\textcircled{1} 9x^2 + 21x + 5 = 0$$

$$x^2 + \frac{7}{3}x = -\frac{5}{9}$$

$$x^2 + \frac{7}{3}x + \frac{49}{36} = -\frac{5}{9} + \frac{49}{36}$$

$$\left(x + \frac{7}{6}\right)^2 = \frac{-4 \cdot 5 + 49}{4 \cdot 9 + \frac{49}{36}}$$

$$\left(x + \frac{7}{6}\right)^2 = \frac{29}{36}$$

$$x + \frac{7}{6} = \pm\sqrt{\frac{29}{36}}$$

$$x = -\frac{7}{6} \pm \frac{\sqrt{29}}{6}$$

$$x = \frac{-7 \pm \sqrt{29}}{6}$$

$$x \approx -0.269, -2.06$$

## Grade 9 – Week #28

for Tuesday

1)  $\rightarrow$

$$15x^2 - 14x - 8 = 0$$

$$x^2 - \frac{14}{15}x + \frac{49}{225} = \frac{8}{15} + \frac{49}{225}$$

$$\left(x - \frac{7}{15}\right)^2 = \frac{15 \cdot 8}{15 \cdot 15} + \frac{49}{225}$$

$$\left(x - \frac{7}{15}\right)^2 = \frac{169}{225}$$

$$x - \frac{7}{15} = \pm\sqrt{\frac{169}{225}}$$

$$x = \frac{7}{15} \pm \frac{13}{15} \rightarrow x = \frac{20}{15}, \frac{2}{15}$$

$$x = \frac{4}{3}, \frac{2}{15}$$

for Thursday

- 2) Perhaps it helps to invert the rates – in other words, instead of thinking of someone painting a house at a rate of 6 hours per 1 house, we express the same thing as  $\frac{1}{6}$  house per hour. The three rates are then  $\frac{1}{6}$  house per hour,  $\frac{1}{4}$  house per hour, and  $\frac{1}{3}$  house per hour. We see then that the combined rate is  $(\frac{1}{6} + \frac{1}{4} + \frac{1}{3}) = \frac{3}{4}$  house per hour, which is also  $\frac{4}{3}$  hour per house. Therefore, it should take 1 hour and 20 minutes to paint the house if they work together.

- 3) We set up this equation:  $x = \frac{1}{5}x + \frac{1}{3}x + 2(\frac{1}{3}x - \frac{1}{5}x) + 18.$

Solving for  $x$ , tells us that there are 90 cows in the herd

**Grade 9 – Week #29**

*for Tuesday*

- 1) The key to this problem is to seek out the contradictions and let them make the determination for you. This can be solved by the process of elimination, but you need a place to start. Boy B could not see 4 red hats, because that would make all the other boys truth-tellers, but their statements contradict this. *So Boy B is lying and has a yellow hat.* Boy C cannot be telling the truth. For if he were, then Boy E would also have to be telling the truth (since we already have determined that Boy B has a yellow hat), but then Boy E's statement wouldn't work. *So Boy C is lying and has a yellow hat.* If Boy E were telling the truth, then Boy A would be seeing three yellow hats and a red hat, but that would mean Boy A would also be telling the truth, which is a contradiction. *So Boy E is lying and has a yellow hat.* Now we need only to determine the color of the hats for Boy A and Boy D. They can't both be yellow, because that would make Boy E a truth-teller. The only thing that works is if Boy A and Boy D both have red hats.

Thus: A: red; B: yellow; C: yellow; D: red; E: yellow.

Lastly, we can confirm that this solution works by checking that all of the statements are consistent with the boys' hat colors.

- 2) Equal amounts of both! In the end, there is  $\frac{4}{5}$  of a cup of milk mixed into the apple juice pitcher, and  $\frac{4}{5}$  of a cup of apple juice mixed into the milk pitcher.

**Grade 9 – Week #30**

*No answers needed*

**Grade 9 – Week #31**

*No answers needed*

**Grade 9 – Week #32**

*No answers needed*