

Mini-math Gr 5/6: Monday, September 21, 2020

- (1) What is the sum of 254 and 388? **Solution:** 642
- (2) What is the product of 25 and 11? **Solution:** 275
- (3) Approximately how much do I weigh in kg? **Solution:** ~ 60
- (4) Estimate $4920 + 8201$ **Solution:** ~ 13000
- (5) Estimate $61901 \div 7$ **Solution:** ~ 9000
- (6) Draw a picture representing two and three quarters. **Solution:** Coin, pie shape, rectangle...
- (7) If I have three and a half cups and remove one and three quarters cups, how many cups do I have? **Solution:** $1 \frac{3}{4}$
- (8) How many quarters are in six fifths? **Solution:** $24/5$

Mini-math Gr 5/6: Monday, September 28, 2020

- (1) What is the sum of 783 and 898?

Solution: 1681

- (2) What is the product of 12 and 75?

Solution: 900

- (3) Approximately how much does a level 5 workbook weigh in g?

Solution: ~ 400. Anywhere from 100 to 2000 would be fine.

- (4) What is two-thirds of five-quarters?

Solution: $5/6$

- (5) How many quarters are in six-fifths?

Solution: $24/5$

Mini-math Gr 5/6: Wednesday, September 30, 2020

- (1) What is the difference of two-fifths and one-sixth?

Solution: $7/30$

- (2) What is the product of $4/5$ and $15/8$?

Solution: $3/2$

- (3) Estimate $28190 \div 7.1$

Solution: 4000

- (4) Three oranges plus a basket weighs 970 g. The empty basket is 100 g. How much is one orange?

Solution: 290 g

Mini-math Gr 5/6: Monday, October 5, 2020

- (1) Alice has 129 marbles. Bob has 234 more marbles than Alice. How many marbles does Bob have?

Solution: 363

- (2) Alice has 129 marbles. Bob has 234 marbles. How many more marbles does Bob have than Alice?

Solution: 105

- (3) Estimate $(358.8 \times 2 - 348) \div 7$

Solution: 50

- (4) Four oranges plus a basket weighs 1253 g. Two oranges plus a basket weighs 684 g. How much is one orange?

Solution: 284.5 g

Mini-math Gr 5/6: Wednesday, October 14, 2020 (8 minutes)

- (1) Alice has ₹200 and buys an igrushka which is ₹78. How many ₹ does she have left?

Solution: ₹200 – ₹78 = ₹122

- (2) Bob places 32 kembangs so that they are touching. If each kembang is 15 sikhil wide, how many sikhil long is the line?

Solution: $15 \times 32 = 480$

- (3) Cindy input $(519.1 \times 3 - 429.3 \times 2) \div (30 - 13)$ into her calculator and got 10.29. Is her answer reasonable? Why or why not?

Solution:

$$\begin{aligned}(519.1 \times 3 - 429.3 \times 2) \div (30 - 13) &\approx (500 \times 3 - 400 \times 2) \div 17 \\ &\approx 700 \div 17 \approx 680 \div 17 = 40\end{aligned}$$

A better estimate would be $700 \div 17 \approx 41$, but this is slower. Notice that the first estimate isn't too far off, since $19.1 \times 3 - 29.3 \times 2 \approx 0$. This is the same estimate that we get if we use $520 \times 3 - 430 \times 2$. Finally, notice that even if we make the worse approximation of $700 \div 20 = 35$, this is still not close to 10.29.

Cindy's answer is not very reasonable, since 10.29 is not close to 40.

- (4) Dave wants to solve the following shape algebra problem:

$$7 \blacksquare + 5 \blacktriangle = 160$$

$$8 \blacksquare + 6 \blacktriangle = 191$$

What steps should he take in solving it? (You do not need to solve it!)

Solution: Method 1: Multiply the first equation by 8 and the second by 7, so that \blacksquare can be eliminated. Subtract the second equation from the first and divide both sides by $5 \cdot 8 - 6 \cdot 7$, so part of the answer is

$$\blacktriangle = \frac{160 \cdot 8 - 191 \cdot 7}{5 \cdot 8 - 6 \cdot 7}$$

(or subtract the first from the second and divide by $6 \cdot 7 - 5 \cdot 8$)

Method 2: Multiply the first equation by 6 and the second by 5, so that \blacktriangle can be eliminated. Subtract the second equation from the first and divide both sides by $7 \cdot 6 - 8 \cdot 5$, so part of the answer is

$$\blacksquare = \frac{160 \cdot 6 - 191 \cdot 5}{7 \cdot 6 - 8 \cdot 5}$$

(or subtract the first from the second and divide by $8 \cdot 5 - 7 \cdot 6$)

Either way, plug back into one of the equations to solve for the other shape.

Mini-math Gr 5/6: Monday, October 19, 2020 (6 minutes)

- (1) Alice has \$15.72 of change and wants to buy some drinks which are \$1.99 each. How many drinks can she buy?

Solution: $15.72/1.99 \approx 14/2 = 7$. Even with tax, this is enough.

- (2) Half of Bob's money is the same as a third of Cindy's money. What is the ratio of Bob's money to Cindy's money?

Solution: $2 : 3$

- (3) Dave has a pumpkin that is nearly a perfect fit for his square box which has a 30 cm side length. He would like to place a ribbon around the widest part of the pumpkin. If he needs 35 cm to tie a bow as well, about how much ribbon does he need?

Solution: The circumference of the pumpkin is $\pi d \approx 3.14 \times 30 \approx 94.2$, so he needs about 130 cm.

Mini-math Gr 5/6: Monday, October 26, 2020 (6 minutes)

- (1) Alice is preparing bags of goodies for her friends as a Halloween treat. She would like to give each of her friends 12 candies, and has 16 friends should would like to give a bag to. If the candy she wants to buy comes in packs of 10, how many packs of candy does she need to buy?

Solution: She needs $12 \times 16 = 192$ candies, so we calculate $192/10 = 19.2$. Then she needs to buy 20 packs.

- (2) $\frac{1}{2}$ of Bob's money is equal to $\frac{1}{3}$ of Cindy's money is equal to $\frac{1}{5}$ of Dave's money. Find the ratio of Bob's money to Cindy's money to Dave's money.

Solution: Represent Bob's money as 2 boxes, Cindy's as 3 boxes, and Dave's money as 5 boxes. Then the ratio is $2 : 3 : 5$.

Better yet: use least common numerators, so that the ratio is $2 : 3 : 5$ immediately.

- (3) Erica and Felix have 400 g of cotton candy. After Erica gives $1/9$ of her cotton candy to Felix, they have the same amount of cotton candy. How much more cotton candy did Erica start with than Felix?

Solution: Represent Erica's candy as 9 boxes. If she gives 1 box away, she has 8 boxes, which must be how much Felix has. Then 16 boxes is 400 g, so 1 box is 25 g, and so Erica started with $2 \times 25 = 50g$ more than Felix.

Mini-math Gr 5/6: Monday, November 2, 2020 (8 minutes)

- (1) Alice scored 85, 92, 89, 95, and 88 points on her five tests. What was her average score, to the nearest whole point?

Solution:

$$\frac{85 + 92 + 89 + 95 + 88}{5} = \frac{449}{5} \approx \frac{450}{5} = 90$$

or calculate the average score exactly as 89.8.

- (2) Order the following decimals from least to greatest:

1.234, 1.25, 1.09, 1.23

Solution:

1.09, 1.23, 1.234, 1.25

- (3) $\frac{4}{5}$ of Bob's money is equal to $\frac{3}{11}$ of Cindy's money is equal to $\frac{6}{7}$ of Dave's money. Find the ratio of Bob's money to Cindy's money to Dave's money.

Solution: Using common numerators, $\frac{12}{15}$ of Bob's money is equal to $\frac{12}{44}$ of Cindy's money is equal to $\frac{12}{14}$ of Dave's money. Therefore, the ratio of Bob's money to Cindy's money to Dave's money is 15 : 44 : 14.

- (4) Erica went shopping and spent \$35 on a shirt. She used $\frac{1}{4}$ of her remaining money to buy a bag. She was then left with $\frac{1}{3}$ of her initial amount of money. How much money did she have at first?

Solution: Erica's money is 4 boxes and \$35, and ends with 3 boxes after buying the shirt and bag. Then 9 boxes is her original amount, so 5 boxes is \$35, giving 1 box is \$7, and her original amount is \$63.

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, November 16, 2020 (5 minutes)

Each question is worth 2 marks: 1 for the work and 1 for the answer.

- (1) The base of an aquarium measures 70 cm by 60 cm. If you pour $84,000 \text{ cm}^3$ of water into the aquarium, what will be the depth of the water ?

Solution: $84000 / (70 \cdot 60) = 20$

- (2) Apples cost \$1 each and oranges \$1.25 each. You buy four apples and three oranges and you pay with a \$10 bill. How much change does the seller give back to you?

Solution: $10 - 4 \cdot 1 - 3 \cdot 1.25 = 2.25$

- (3) The ratio of girls to boys at a party is $2 : 3$. When five boys leave, the ratio of girls to boys becomes $4 : 5$. How many girls were at the party?

Solution: The number of girls does not change, so use equivalent ratios: the least common multiple of 2 and 4 is 4, so the ratio of girls to boys to start is $4 : 6$. Then 1 unit represents the 5 boys leaving, so there are $4 \cdot 5 = 20$ girls at the party.

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, November 23, 2020 (8 minutes)

Each question is worth 2 marks: 1 for the work and 1 for the answer.

- (1) The ratio of girls to boys at a party is $2 : 3$. When eight boys leave and eight girls arrive, the ratio of girls to boys becomes $4 : 5$. How many girls were at the party at the end?

Solution: The total number of students does not change, so use equivalent ratios: the least common multiple of $2 + 3 = 5$ and $4 + 5 = 9$ is 45, so the ratio of girls to boys to start is $18 : 27$ and at the end is $20 : 25$. Then 2 units represents the 8 boys leaving or 8 girls arriving, so there are $10 \cdot 8 = 80$ girls at the party.

- (2) Erica went shopping and spent \$45 on a shirt. She used $1/6$ of her remaining money to buy a bag. She was then left with $25/32$ of her initial amount of money. How much money did she have at first?

Solution: Erica's money is 6 boxes and \$45, and ends with 5 boxes after buying the shirt and bag. Then 5 boxes is $25/32$ of her initial amount, so her initial amount is $32/5$ boxes. Then $2/5$ of a box is \$45, so $32/5$ boxes is $16 \cdot 45 = 720$.

Or: In order for us to talk about $25/32$, we instead use 30 boxes and \$45 to represent Erica's money, so she ends with 25 boxes after buying the shirt and bag. Then she began with 32 boxes, so 2 boxes is \$45, and 32 boxes is $16 \cdot 45 = 720$

Or: Let E be Erica's money at first. Then

$$\begin{aligned}\frac{5}{6}(E - 45) &= \frac{25}{32}E \\ \frac{1}{3}(E - 45) &= \frac{5}{16}E \\ 16(E - 45) &= 15E \\ E &= 16 \cdot 45 = 720\end{aligned}$$

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, December 7, 2020 (8 minutes)

Each question is worth 2 marks: 1 for the work and 1 for the answer.

- (1) The ratio of girls to boys at a party is $4 : 3$. When 15 girls arrive, the ratio of girls to boys becomes $7 : 4$. How many people were at the party at the end?

Solution: The number of boys does not change, so use equivalent ratios: the least common multiple of 3 and 4 is 12, so the ratio of girls to boys to start is $16 : 12$ and the ratio at the end is $21 : 12$. Then 5 units represents the 15 girls arriving, so 1 unit is 3 girls, and so there are $33 \cdot 3 = 99$ people at the party at the end.

- (2) Solve for x and y :

$$x + y = 5$$

$$x - y = 28$$

Solution: Adding, $2x = 33$ so $x = 33/2$. Subtracting, $2y = -25$ so $y = -25/2$.

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, January 11, 2021 (8 minutes)

Each question is worth 5 marks: 4 for the work (including presentation) and 1 for the answer.

- (1) Suppose that at SuperOffice, the cost of a pencil is \$1.20 less than a pen. Alice bought 6 pencils and 2 pens and spent \$6.80. How much did each pen cost?

Solution: 6 pencils cost $6 \times \$1.20 = \7.20 less than 6 pens, so since 6 pencils and 2 pens cost \$6.80, then 8 pens would cost $\$6.80 + \$7.20 = \$14$. Then 1 pen would cost $\$14/8 = \1.75 .

- (2) At Amozan, shipping boxes measure 41 cm by 31 cm by 14 cm. A retail outlet has put out a large order on sprockets, which Amozan sells in boxes which are cubes with a side length of 2 cm. How many boxes of sprockets can fit inside a single Amozan shipping box?

Solution: $41/2 = 20.5, 31/2 = 15.2, 14/2 = 7$, so an Amozan shipping box can hold 20 sprocket boxes lengthwise, 15 boxes widthwise, and 7 boxes heightwise. Then $20 \times 15 \times 7 = 2100$ sprocket boxes can fit inside a single Amozan shipping box.

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, January 18, 2021 (12 minutes)

Each question is worth 5 marks: 4 for the work (including presentation) and 1 for the answer.

Calculators allowed!

- (1) Alice bought a total of 9.8 kg of apples, some of which cost \$2.80/kg and some of which cost \$3.15/kg. Alice paid with a \$50 note and received \$21.09 in change. To the nearest gram, how many grams of the more expensive apples did she buy?

Solution: Alice spent $\$50 - \$21.09 = \$28.91$. Let c and e represent the kg of cheap and expensive apples Alice bought, respectively. We are solving

$$c + e = 9.8$$

$$2.8c + 3.15e = 28.91$$

Multiplying the first equation by 2.8, we get $2.8c + 2.8e = 27.44$. Subtracting from the second equation, $0.35e = 1.47$, so $e = 4.2$ kg, that is, $e = 4200$ grams.

OR: Let x represent the number of kg of expensive apples Alice bought. Then she bought $9.8 - x$ kg of cheap apples. Then

$$3.15x + 2.8(9.8 - x) = 28.91$$

$$0.35x + 27.44 = 28.91$$

$$0.35x = 1.47$$

$$x = 4.2$$

OR: If Alice only bought cheap apples, she would have spent $(9.8)(2.8) = 27.44$ dollars, which is $\$28.91 - \$27.44 = \$1.47$ too little. If Alice buys expensive apples instead of cheap apples, she would spend $\$3.15 - \$2.80 = \$0.35$ more per kg. Then she bought $1.47/0.35 = 4.2$ kg of the expensive apples.

- (2) A 1-litre beaker contained 713 cm^3 of water. When 8 identical metal cubes were placed in it, 492 cm^3 of water overflowed. What was the length of each side of each metal cube in cm, to the nearest hundredth of a cm? (1 L = 1000 cm^3)

Solution: The volume of the 8 cubes is $(1000 - 713) + 492 = 779 \text{ cm}^3$, so the volume of 1 cube is $779/8 = 97.375 \text{ cm}^3$ and so the length of each side of each cube is $97.375^{1/3} \approx 4.60$ cm.

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, January 25, 2021 (12 minutes)

For each question, 1 mark is for the answer and the rest is for the work (including presentation).

Calculators allowed!

- (1) (5 marks) Penny has 46 coins in her piggy bank, all of which are either quarters or dimes. If Penny has \$8.65 in total, how many quarters does she have?

Solution: Let q and d represent the number of quarters and dimes Penny has, respectively. We are solving

$$q + d = 46$$

$$0.25q + 0.1d = 8.65$$

Multiplying the first equation by 0.1, we get $0.1q + 0.1d = 4.6$. Subtracting from the second equation, $0.15q = 4.05$, so $q = 27$. Penny has 27 quarters.

- (2) (3 marks) Evaluate the following for $x = 2021$:

$$(3(3x + 8) + 26 + x)/10 - x$$

Solution:

$$\begin{aligned} (3(3x + 8) + 26 + x)/10 - x &= (9x + 24 + 26 + x)/10 - x \\ &= (10x + 50)/10 - x \\ &= x + 5 - x \\ &= 5 \end{aligned}$$

OR

$$\begin{aligned} (3(3(2021) + 8) + 26 + 2021)/10 - 2021 &= (3(6063 + 8) + 2047)/10 - 2021 \\ &= (3(6071) + 2047)/10 - 2021 \\ &= (18213 + 2047)/10 - 2021 \\ &= 20260/10 - 2021 \\ &= 2026 - 2021 \\ &= 5 \end{aligned}$$

Name: _____

Mark: _____

Mini-math Gr 5/6: Monday, February 1, 2021 (12 minutes)

For each question, 1 mark is for the answer and the rest is for the work (including presentation).

Calculators allowed!

- (1) (2 marks) Simplify the following as much as possible

$$3(2x + 3) - 2(x - 1)$$

Solution:

$$\begin{aligned} 3(2x + 3) - 2(x - 1) &= 6x + 9 - 2x + 2 \\ &= 4x + 11 \end{aligned}$$

- (2) (5 marks) Penny had some nickels, dimes, and quarters in her bag. The number of nickels was $1/3$ the number of quarters. The number of dimes was $1/2$ the number of quarters. After spending all of her dimes and $2/3$ of her quarters, she had \$3.60 left in her bag. How much money did she spend altogether?

Solution: Method 1: Let q be the number of quarters. Then $q/3$ is the number of nickels, and $q/2$ is the number of dimes. After Penny spends all her dimes and $2/3$ of her quarters, she is left with $q/3$ quarters and $q/3$ nickels. This is worth

$$\frac{25q}{3} + \frac{5q}{3} = \frac{30q}{3} = 10q$$

cents. Since she has \$3.60 left, this gives $q = 36$, so she had $36/2 = 18$ dimes. Then Penny spent

$$18 \cdot 10 + \frac{2}{3} \cdot 36 \cdot 25 = 180 + 600 = 780$$

cents, or \$7.80.

Method 2: Let

$6\square$ = the number of quarters

$2\square$ = the number of nickels

$3\square$ = the number of dimes

Then she after spending all her dimes and $2/3$ of her quarters, Penny has $2\square$ quarters and $2\square$ nickels, which is worth

$$360 = 2\square \cdot 25 + 2\square \cdot 5$$

$$360 = 2\square \cdot 30$$

$$6 = \square$$

Then she spent $3 \cdot 6 = 18$ cents in dimes and $4 \cdot 6 = 24$ quarters, which is $18 \cdot 10 + 24 \cdot 25 = 180 + 600 = 780$ cents, or \$7.80.