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:** 2751

(3) Approximately how much do I weigh in kg? **Solution:** ~ 60

(4) Estimate 4920 + 8201 **Solution:** ~ 13000

(5) Estimate 61901 ÷ 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:

$$\begin{aligned}7\blacksquare + 5\blacktriangle &= 160 \\ 8\blacksquare + 6\blacktriangle &= 191\end{aligned}$$

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 ■ 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 ▲ 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:

$$1.234, \quad 1.25, \quad 1.09, \quad 1.23$$

Solution:

$$1.09, \quad 1.23, \quad 1.234, \quad 1.25$$

(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 1/4 of her remaining money to buy a bag. She was then left with 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 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.

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