# GRADE 6 FACTORS & MULTIPLES

CLOSED QUESTIONS

1. Describe or show a way that you can find all the factors of a number without missing any. Use 24 as an example.

2. Why do perfect squares always have an odd number of factors? Explain and give a few examples.

3. What is the greatest common factor of 18 and 20? Show how you know.

4. What is the least common multiple of 5 and 9? Show how you know.

5. Can the LCM of two numbers be smaller than the numbers? Explain. You can use an example to help you.

6. Can the LCM of two numbers be bigger than the numbers? Explain. You can use an example to help you.

7. Can the GCF of two numbers be smaller than the numbers? Explain. You can use an example to help you.

8. Can the GCF of two numbers be bigger than numbers? Explain. You can use an example to help you.

9. Use the divisibility rules to determine whether 3 and 4 are factors of 426.

10. What are the first 10 prime numbers?

11. Why is 2 a special prime number?

12. Use a systematic method to find all the factors of 108.

13. Use square tiles to make as many rectangles as you can with
a. 12 tiles
b. 18 tiles
c. 36 tiles
d. 11 tiles.

You must use all the tiles for each one. Example: for 8 tiles you would have two rectangles: 1-by-8 and 2-by-4 (8-by-1 and 4-by-2 are not different rectangles). Keep track of your rectangles by drawing them on graph paper. How does the number of rectangles relate to how many factors a number has?

14. If a pattern is: 

what will the 48th term of the pattern be? Explain.

15. Your school PAC is going to make hamburgers for the back-to-school picnic. Hamburger patties come in packs of 12 and buns come in packs of 8.
How many packs of each would need to be bought to have the same number of patties and buns?
How many packs of each will the PAC need to buy if they are expecting 300 people at the picnic?

16. Ali has 12 apples, 20 grapes, and 8 pears. They want to divide them equally into containers. What is the minimum number of containers Ali can use? How many of each fruit will be in each container?

17. Find the GCF and LCM of:
a. 24 and 36

b. 16 and 80

18. Why isn't 1 prime or composite?

19. Pencils come in packages of 10. Erasers come in packages of 12. Phillip wants to purchase the smallest number of pencils and erasers so that he will have exactly 1 eraser per pencil. How many packages of pencils and erasers should Phillip buy?

20. Make a factor tree for 42 and one for 13. What are their prime factorizations?

21. When the GCF of two numbers is 1, what can you say about their LCM?
Try some examples to find out.

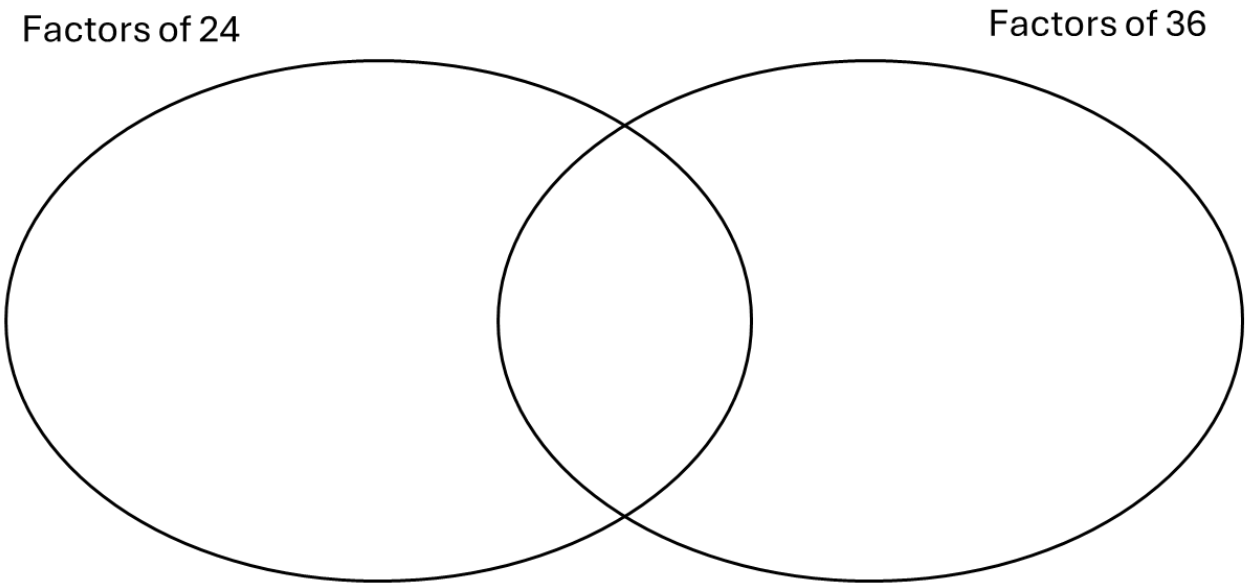
22. Use divisibility rules to determine if 380 and 2403 are divisible by 2, 3, 4, 5, 6, 9, and 10.

23. Which one of the following numbers is prime? How do you know?

266, 480, 761, 909

24. Are all odd numbers prime? Why or why not?

25. Place the numbers in the correct positions in the Venn diagram below.




1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36

26. In a grade 6 class, the number of students in the class is prime.
There are between 20 and 30 students in the class. How many students could there be?

27. Here is a hundred chart. Are there more prime numbers between 1 and 100 or more composite numbers? How do you know?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

5. Write two numbers that have an LCM of 30.

6. Write two numbers that have an LCM of 45.

7. The 4-digit number below is divisible by 6. What could the number be? Explain or show your thinking.

49___ ___

# GRADE 6 FACTORS & MULTIPLES

OPEN QUESTIONS

1. Write two numbers that have a GCF of 3.

2. Write two numbers that have a GCF of 5.

3. Write two numbers that have a GCF of 1.

4. Challenge: Write two numbers that have a GCF of 14.

8. Write a number that is divisible by 2 and 5, but not 3.

9. What are two numbers that have at least one 2 and one 3 in their prime factorizations? Your numbers can have other prime factors as well.

10. What pattern do the multiples of 3 make in a hundred chart?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

1. What is the ratio of vowels to consonants in the word “triangle”? What is the ratio of consonants to vowels?

2. At a local pond you see 4 ducks, 3 frogs, and a turtle. What is the ratio of ducks to other animals? What is the ratio of frogs to turtles? What is the ratio of frogs to all animals?

3. In a combined Grade 5/6 class, there are 12 Grade 5s and 14 Grade 6s. What is the ratio of Grade 5s to Grade 6s in lowest terms? What is the ratio of Grade 6s to all students in lowest terms? Show your thinking.

4. Write a part-to-part and a part-to-whole ratio for the following picture:

5. Write 2 equivalent ratios for each ratio.

a. 3 : 5

b. 14: 36

6. Write an equivalent ratio with 15 as one of the terms.

4 : 6

7. Are the ratios in each pair equivalent? Explain how you know.
a. 2:3 and 8:10

b. 15:25 and 36:60

8. Find the missing term:

a. 7:9 = ____: 27

b. 4: ___ = 16: 24

9. Scale down this ratio by a factor of 4:

28 : 52 = ____ : _____

10. Rocco lives on a farm. The ratio of chickens to cows on the farm is 3:4. If there are 12 chickens, how many cows are there?

11. A recipe uses 3 g of spice for every 5 g of flour. To keep the same flavor, how much spice is needed for 40 g of flour?

12. A smoothie recipe calls for 2 cups of strawberries for every 5 cups of yogurt. If you want to make enough for a party using 20 cups of yogurt, how many cups of strawberries do you need? Explain your reasoning.

13. A car travels 90 km in 3 hours at a constant speed.
a. How far will it travel in 5 hours at the same speed?
b. How long will it take to travel 150 km?

14. In a garden mix, the ratio of soil to compost is 7 : 2.
a. If you have 21 kg of soil, how much compost do you need?
b. If you only have 6 kg of compost, how much soil can you mix?

15. A classroom's student-to-computer ratio is 5 : 2.
a. If there are 40 students, how many computers are there?
b. If the school wants to provide 30 computers at the same ratio, how many students would that serve?

16. A tailor uses 4 meters of fabric to make 3 dresses. At that same rate, how many dresses can she make from 28 meters of fabric? How much fabric would she need for 10 dresses?

17. A trail mix recipe calls for 2 cups of peanuts, ½ cup of raisins, ½ cup of almonds, and ¼ cup of pumpkin seeds.
a. What is the ratio of almonds to pumpkin seeds? Remember, ratios are always expressed using whole numbers.

b. You and a friend tried this recipe and accidentally added ½ cup of pumpkin seeds. How could you adjust the rest of the ingredients, so they are all in the correct ratio?

18. Draw a picture that shows a part-to-part ratio of 2:7.

19. Draw a picture that shows a part-to-whole ratio of 2:7.

20. Write three ratios that are equivalent to 4:6.

21. A quilt block design uses 12 red squares and 18 white squares, as shown in the table:

| Colour | Number of Squares |
|---|---|
| Red | 12 |
| White | 18 |

Maria wants to make smaller quilt blocks that keep the same red-to-blue ratio. How many different smaller quilt blocks (with whole-number squares of each color) could Maria make? Explain your reasoning.

22. Which one doesn't belong:
Which ratio isn't equivalent to the others? Justify your choice with a calculation or drawing.

| | | |
|---|---|---|
| 300 mL juice:<br>150mL water | 500 mL juice:<br>250 mL water | 450 mL juice:<br>200 mL water |

23. What is the same? What is different?
Describe what's the same about these mixes, what's different, and prove they're equivalent.
Farmer A mixes seed and soil at 3 kg seed: 12 kg soil.
Farmer B mixes at 5 kg seed: 20 kg soil.

24. Invent two lemonade recipes that use the same ratio of sugar (in grams) to lemon juice (in mL) but result in different total volumes. Show how you scale one up to match the other.

25. “If you cut both parts of a ratio in half, you get an equivalent ratio.”
True or false? Give two examples in metric (e.g. cm or L) and explain why.

26. A car uses 6 L of fuel to travel 90 km. How far can it go on 10 L? How many liters for 150 km? Show at least two strategies.

27. Find two different length ratios (in centimeters) whose decimal values are between 0.3 and 0.4 (e.g., 3 cm: 10 cm = 0.3). Show your division for each ratio to confirm that the decimal falls within the range.

28. I mix paint at a ratio of 4 parts blue dye to  x parts water. When I add 8 L more water, my ratio becomes 4:12. What was x? List all whole-number answers and justify.

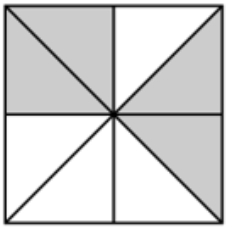
29. On a map, 1 cm represents 5 km of actual (real) distance. Complete the table to show the actual distances.

| Map Scale 1cm on the map: 5km actual distance | |
|---|---|
| 1cm | |
| 2cm | |
| 3cm | |
| 4cm | |
| 5cm | |

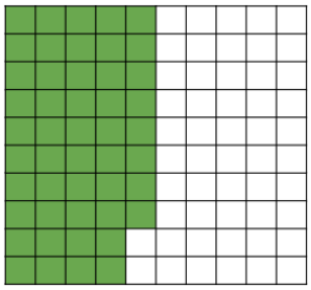
30. You're mixing green paint by combining blue and yellow in a 3 : 5 ratio.
If you start with 3 L of blue and 5 L of yellow, draw a double number line that shows how much yellow you need when you use:
– 6 L of blue
– 9 L of blue
– 12 L of blue

1. Draw a shape and shade 75% of it.

2. What percent of the square is shaded?



3. What percent is shown below?



4. What percent is 0.4? What about 0,04? 0.40? Draw or explain to share your thinking.

5. Which do you think is bigger? 23% of $48 or 48% of $23? Use an estimation strategy and explain your thinking.

6. Use mental math to calculate 10% of the following values:

| | 10% of the value |
|---|---|
| 7 | |
| 36 | |
| 154 | |
| 48026 | |

7. Use mental math to calculate 20% of the following values:

| | 20% of the value |
|---|---|
| 8 | |
| 48 | |
| 360 | |
| 1250 | |

8. Find each percent. Show your thinking.

a. 20% of 40

b. 15% of 200

c. 75% of 80

d. 35% of 300

e. 5% of 70

f. 3% of 890

g. 120% of 60

h. 105% of 70

i. 15.5 % of 90

9. Calculate the total tax (GST and PST in BC) on a sound system that costs $1235.

10. Three Grade 6 classes held a pizza party. There were 90 students in total, and each student chose one slice of pizza. The pizza choices were cheese, chicken, or vegetarian. 36 students selected cheese, 30 selected BBQ chicken, and the rest chose vegetarian. What percentage of students chose vegetarian pizza?

11. A fundraiser sells 120 raffle tickets. If 35% of the tickets win a prize, how many winning tickets are there?

12. Jamal earns a 6% commission on all his sales at a clothing store. Last month, he sold $4250 worth of goods. How much commission did he earn?

13. A dinner bill in a restaurant comes to $72.45. You leave an 18% tip. How much is the tip? What is the total you pay?

14. Mei buys a jacket marked at $89.99 on Robson Street in Vancouver, BC. Calculate the total cost including GST and PST.

15. A pair of running shoes is on sale for 25% off the original price of $120. What is the dollar amount of the discount? What is the sale price?

16. Hugo borrows $2500 at a simple annual interest rate of 4.2%. How much interest will he owe after 1.5 years.

17. The original cost of an item is $150. It is on sale for 75% off. What is the discount and sale price? Use a number line to show your thinking.

18. Celia works as a barista at a café. Her last customer's order came to $200. The customer left her a $30 tip. What percentage of the bill was the tip?

19.Josephine scored 12 baskets out of 30 shots in her first basketball game this year. Her scoring average was then 40%. The next game, she made ten shots and raised her scoring average for both games to 50%. How many of the ten shots in the second game were baskets?

20. Describe how to calculate 25% of a number in three different ways. Use pictures, words, numbers and/or symbols to represent your thinking.

21. How is multiplying 0.01 x 68 similar to multiplying 0.68 x 100?

22. What is a good estimate for 42% of 85? Explain your strategy.

23. Describe how knowing 75% of a number helps you figure out 10% of that number.

24. Jayla and Rhea paid the same amount of money for their sweaters, but Jayla got her sweater at a 40% off sale, and Rhea got hers at a 20% off sale. How were the original prices of the sweaters related? Explain.

25. Which one doesn't belong? Which expression isn't equivalent to the others. Justify your thinking using math.

| | |
|---|---|
| 8 % of $250 | 0.08 × 250 |
| 250 × 8 % | 250 ÷ 12.5 |

26. Justify your thinking using math. Would you rather earn a 5 % sales commission on $2400 in sales, or a 7 % commission on $1 800 in sales? Explain which choice gives you more money and why.

27. Describe what's the same about how you calculate the tax and what's different
Scenario A: A $60 item has a 10 % sales tax.
Scenario B: A $120 item has a 20 % sales tax.

28. Invent two restaurant-tip problems: one using 18 % and another using 20 %. Make the bill totals different but find a way so both tips come out to whole dollars. Show how you chose your bill amounts.

29. True or False? Justify your thinking using math.
If you double the price of an item and keep the discount percent the same, the dollar amount saved also doubles.

1. Use front-end estimation to find the approximate value of each product. Then, indicate if your estimate is the same, an overestimate, or an underestimate of the exact product. Explain your thinking.

a. 28. 2 x 5

b. 41.6 x 7

c. 59.9 x 4

d. 73.5 x 3

2. Use front-end estimation to place each decimal point. Explain your thinking.

a. 3.12 x 6 = 1872

b. 15. 486 x 5 = 7743

c. 8.7 x 3 = 261

3. Use the number line and benchmark decimals below to find the approximate value of each product. Then, indicate if your estimate is the same, an overestimate, or an underestimate of the exact product. Explain your thinking using words, pictures and symbols.

a. 0.3 x 3 =

b. 0.45 x 4 =

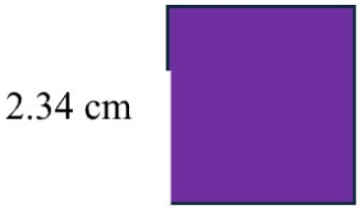
4. Use compatible numbers to find the approximate value of each product. Then, indicate if your estimate is the same, an overestimate, or an underestimate of the exact product. Explain your thinking.

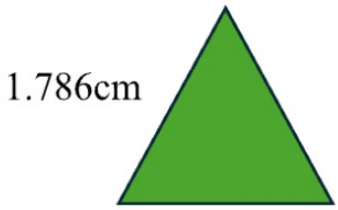
a. 5.48 x 7

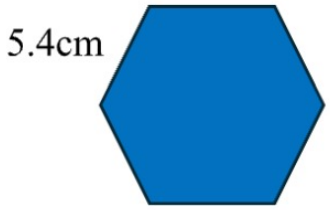
b. 6.893 x 4.2

c. 374.271 x 0.6

5. Estimate the perimeter of each polygon. Show your thinking.




6. Estimate the side length of a pentagon with a perimeter of 58.8cm.

7. Is 8.45 x 5 greater than, or less than, 40? How can you estimate to find out?

8. Place the decimal in the product. Justify your thinking.

| | |
|---|---|
| 5.43 x 6 | 344.9 x 4.3 |
| 3258 | 148307 |
| Place the Decimal...Justify! | Place the Decimal...Justify! |

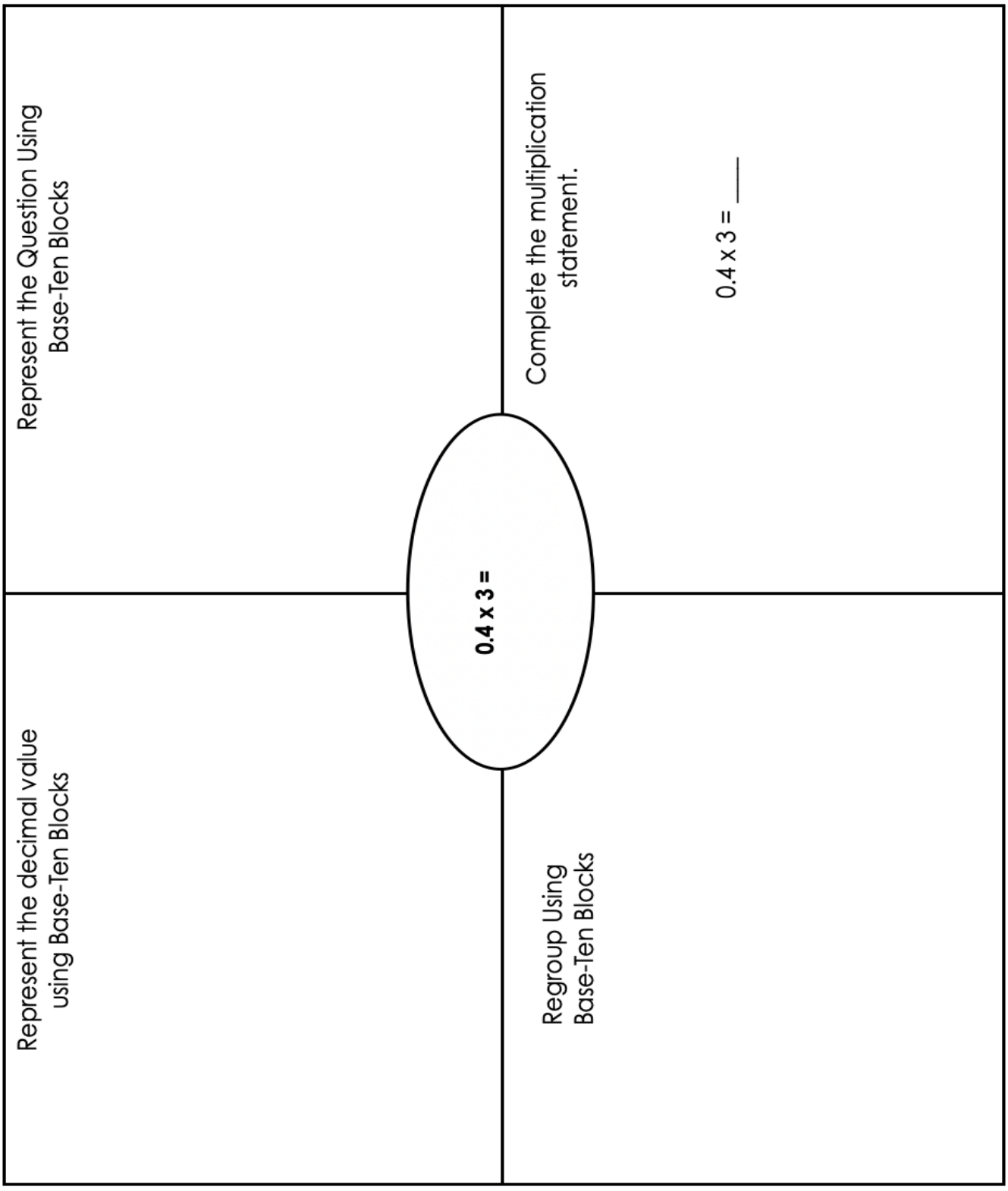
9. How can you use repeated addition to multiply 365.78 by 4?
Represent your thinking using words, pictures, and symbols.

10. Use repeated addition to multiply the following:
a. 7.896 x 5 =

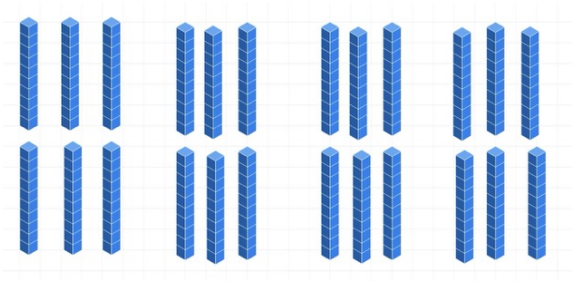
b. 0.4012 x 3 =

c. 591. 3 x 9 =

11.


Represent the Question Using Base-Ten Blocks
Complete the multiplication statement.
0.4 x 3 = ___
0.4 x 3 =
Represent the decimal value using Base-Ten Blocks
Regroup Using Base-Ten Blocks

12. Find the product using base-ten blocks. What multiplication statement represents the model?

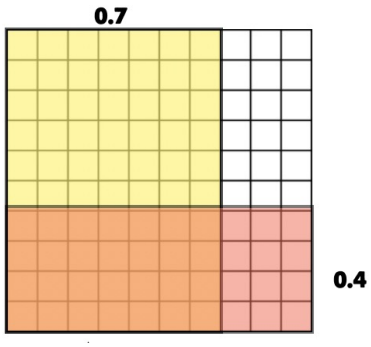


13. Use base-ten blocks to multiply. Use pictures and symbols to show your thinking.
a. 0.8 x 5 =

b. 2.3 x 4 =

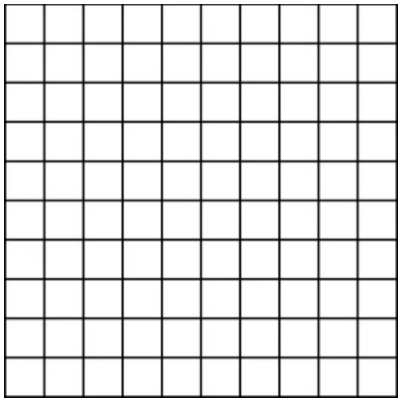
c. 3.96 x 3 =

14. Write a multiplication statement to represent the model below.

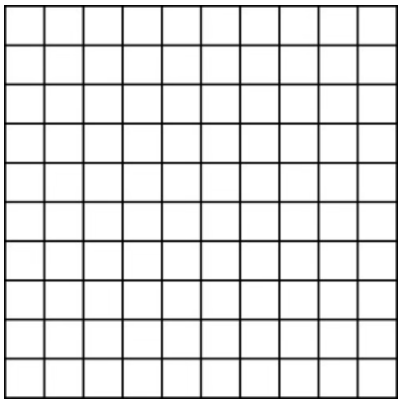



15. Use the grid below to find the product.

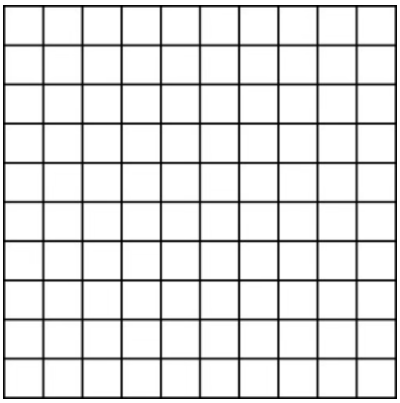
a. 0.4 x 0.9 =



b. 0.8 x 0.6 =



c. 0.3 x 0.5 =



16.

# Multiplying Decimals Using Area Models

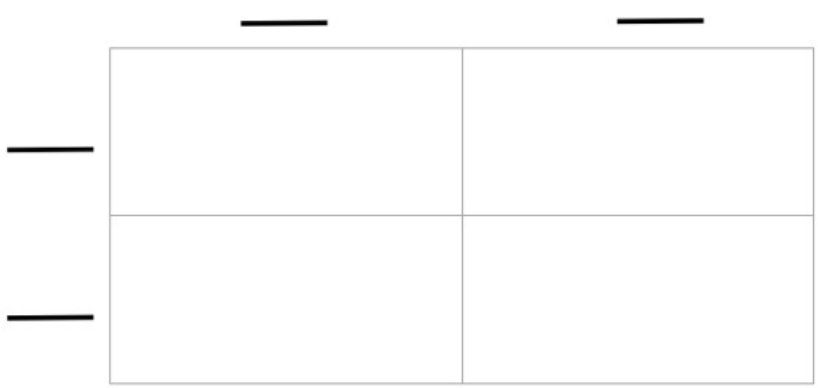
Complete the area model to find the product of 30.5 x 5.3.

Sum of Products

Multiplication Statement

____ x ____ = ____

Complete the area model to find the product of 12.52 x 13.91.



Sum of Products

Multiplication Statement

____ x ____ = ____

17. Use an area model to multiple. Use pictures and symbols to show your thinking.
a. 2.8 x 6 =

b. 4.125 x 5 =

c. 582.37 x 14 =

18. Use place value and reordering (standard algorithm strategy) to find the product.
a. 148.73 x 5 =

b 0.125 x 0. 368 =

c. 0.456 x 1.789 =

19. Max weighs 107 pounds. On mercury she would weigh 0.36 times that amount. How much would she weigh on Mercury?

20.There are 400 mangoes in a barrel. Each mango weighs 0.75 pounds. What is the total weight of the mangoes in the barrel.

21. George bought 12 tickets for him and his friends to see his favourite band in concert at a cost of $125.50 per ticket. What is the total cost of all 12 tickets?

22. The Grade 6 class is selling reusable water bottles for $4.75 each. They sold 36 bottles in the first week and 24 bottles in the second week. How much money did they raise in total over the two weeks?

23. A bag of apples weighs 1.25 kg. A shopper buys 4.5 bags. If each kilogram of apples costs $3.20, how much will the shopper pay in total?

24. Each paintbrush costs $2.39. A teacher buys 15 paintbrushes and 8 palettes that cost $3.75 each. What is the total cost of all the art supplies?

25. A special consisting of a sandwich, soup and juice cost $14.80. If you paid for 5 of these meals, how much change should you get back from a 100-dollar bill?
Anoop paid a total of $51.83, before taxes, for a cap and three pens. If the cap cost $36.98, how much did each pen cost?

1. Use front-end estimation to find the approximate value of each quotient. Then, indicate if your estimate is the same, an overestimate, or an underestimate of the exact product. Explain your thinking.

a. 55.3 ÷ 5 =

b. 44.7 ÷ 7 =

2. The decimal point is missing in each quotient. Use estimation to place each decimal point. Explain your thinking.

a. 8.2 ÷ 2 = 41

b. 11.919 ÷ 9 = 1324

3. Estimate (use either rounding, front-end estimation, or compatible numbers), then divide using repeated subtraction.

a. 2.8 ÷ 4 =

b. 5.25 ÷ 5 =

c. 8.1 ÷ 3 =

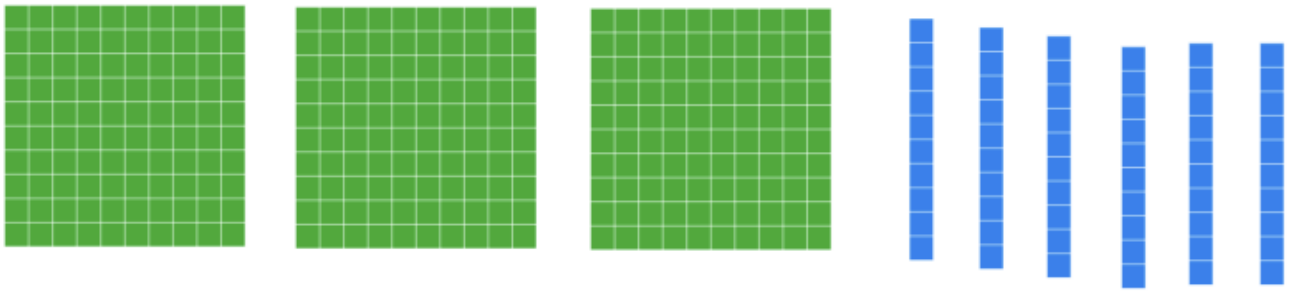
d. 64.3 ÷ 8 =

e. 79.8 ÷ 5 =

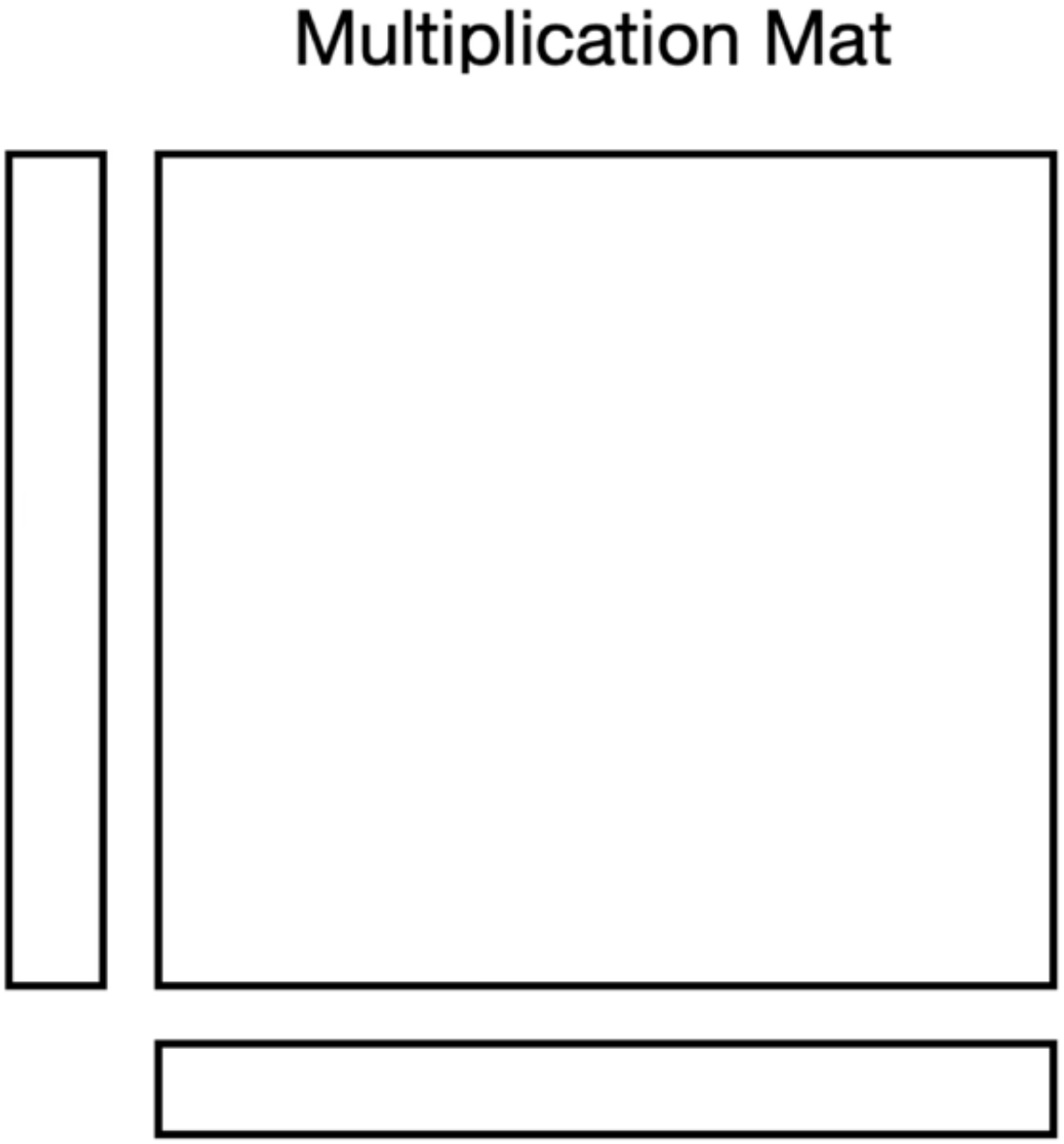
4. Estimate (use either rounding, front-end estimation, or compatible numbers), then divide using repeated subtraction.

| | |
|---|---|
| a. 2.8 ÷ 4 = | b. 5.25 ÷ 5 = |
| c. 8.1 ÷ 3 = | d. 64.3 ÷ 8 = |
| e. 79.8 ÷ 5 = | f. 18.4 ÷ 8 = |
| g. 220.15 ÷ 7 = | h. 71.5 ÷ 6.5 = |

5. Use base-ten blocks to find the quotient. The first step has been completed for you. Continue by showing the remaining steps needed to solve this division problem.
3.9 ÷ 6 = ?



6. Use the multiplication mat and base-ten blocks to divide 6.4 by 4.




| Multiplication Statement | Division Statement |
| --- | --- |
| | |

7.Use base-ten blocks to divide. Show your thinking using pictures and symbols.
a. 36.8 ÷ 8 =

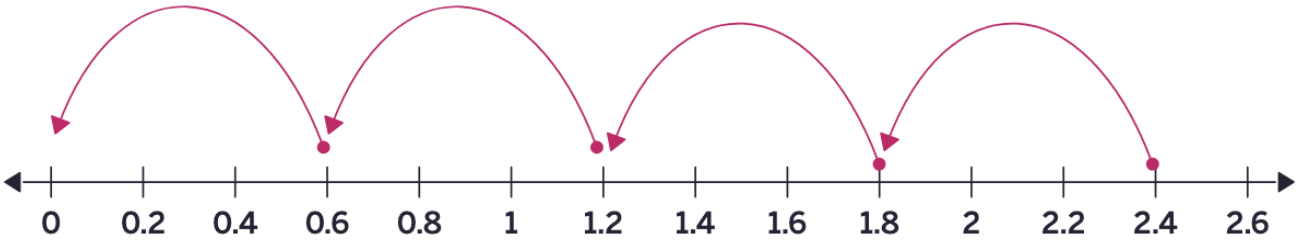
b. 12.66 ÷ 6 =

c. 425.7 ÷ 9 =

d. 1.68 ÷ 3 =

8. The decimal point in the quotient is in the wrong place. Identify the mistake, then write the quotient with the decimal point in the correct place.
15.805÷ 5 = 316.1

9. What division statement can be written to represent the model below?



10. A student solved 24.6 ÷ 0.6 using partial quotients. Review their work below and circle the one mistake they made and describe the error. Then, determine the correct quotient using partial quotients.

Student Work:

| | |
|---|---|
| Step 1: | 0.6 × 40 = 24 |
| | 24.6 − 24 = 0.4 |
| Step 2: | 0.4 < 0.6, so no more groups can be made |
| Step 3: | Final Answer: 40 remainder 0.4 |

11. Use the standard algorithm strategy (standard step-by-step long division process) to divide.

| | |
|---|---|
| a. 9.3 ÷ 6 = | b. 11.68 ÷ 9 = |
| c. 0.142 ÷ 8 = | d. 240 ÷ 0.8 = |
| e. 75 ÷ 0.6 = | f. 13.5 ÷ 1.5 = |

12. How many quarters are in $14.75?

13. How many nickels are in 36.25?

14. Jim cut a wooden stick which was 33.6cm long into 3 equal pieces. How long was each piece?

15. I am a number between 1 and 10. When you multiply me by 7, I have a product of 47.6. What number am I?

16. Five tins of soup cost $4.45. How much would three tins cost?

17. Mr. Tierny purchased a new TV set for $5284.20. If he paid for it in 12 equal monthly payments, how much did he pay each month?

18. Three oranges cost the same as two apples. If six apples cost $4.05, how much would one orange cost?

19. Joanne worked 5 hours each weekday for two weeks. If she was paid a rate of $13.50 per hour, how much would she have earned at the end of two weeks?

20. A triangular park has a perimeter of 11. 4 km. How long is each side of the triangle?

21. Alice plans a weekly food budget of $45.60. She wants to spend 0.75 of that on groceries and the rest on dining out.
a. How much will she spend on groceries?
b. How much remains for dining out?

22. A family's monthly utility budget is $95.40. They discover that they can reduce usage by 12% by changing habits.
a. By how many dollars will their bill decrease?
b. What will the new bill be?

23. A ride-sharing app charges $18.45 for a trip, split equally among 4 friends. How much does each friend owe?

24. A printer cartridge lasts for 375 pages and costs $24.99. What's the cost per page?

25. How can you model 16.8 ÷ 12 using base-ten blocks? What is the quotient?

26. Estimate a solution and record it. Then, show at least 3 different ways to solve each question. Use pictures, words, numbers and/or symbols to represent your thinking.

a. 3.29 x 200 =

b. 4.573 ÷ 5 =

27. Use both the long-division algorithm and an area-model diagram to divide 60.84 by 4. Then, answer:
a. What steps or ideas are the same in both methods?
b. What steps or ideas are different?

28. Would you rather multiply 3.5 by 4 or divide 35 by 0.4? Explain your choice and your strategy for solving.

29. Make up two different decimal multiplication problems that have the same answer as 0.8 × 5. How do you know the answers are equal?

30. Which one doesn't belong? Justify your thinking using math.

| | |
|---|---|
| 2 x 1.6 | 4 ÷ 0.5 |
| 3.2 x 1 | 16 ÷ 5 |

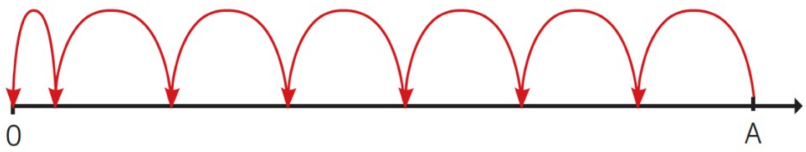
31. You have 2.5 meters of ribbon. You want to cut it into equal pieces. What are possible ways you could divide it to get whole number or decimal lengths? How do you know?

32. Create a math story that could be solved by multiplying two decimals and a math story that could be solved by dividing a decimal by a whole number. Show two ways to solve one of your stories.

33. How can you use partial quotients to divide 7.2 by 3?

34. You multiply two decimal numbers and the answer is slightly less than 7. What might they be?

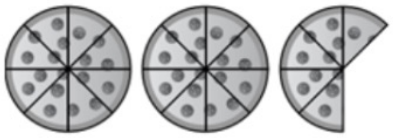
35. Choose a value for the jump size and point A so that this picture shows division with a decimal(s). What division does it show? Notice that the jump to 0 is a different size from all the others.



COASTMETRO
ELEMENTARY MATH PROJECT

# GRADE 6 IMPROPER FRACTIONS & MIXED NUMBERS CLOSED QUESTIONS

1. Write an improper fraction and mixed number for each image.

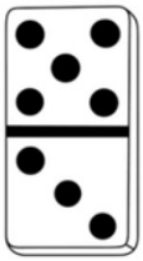
| | | |
|---|---|---|
|  |  |  |
| Improper Fraction:<br>Mixed Number: | Improper Fraction:<br>Mixed Number: | Improper Fraction:<br>Mixed Number: |

2. Draw a picture to represent seven quarters.

3. Circle the fractions that are more than one whole. Explain or show how you know.

6/2 ⅓ 5/3 12/5 2/4 1⅓

4. Draw a picture to represent the improper fraction shown on the domino.

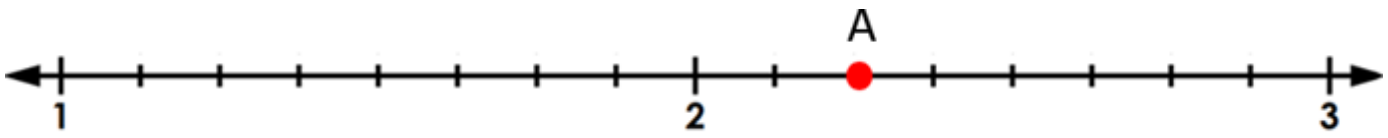


Write the number as an improper fraction and a mixed number.

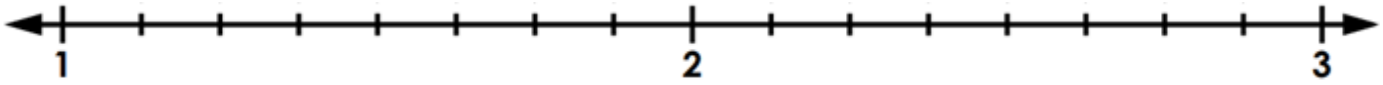
5. Write two fractions that are equivalent to 8/6.

6. How many eighths are in 2 wholes? 3 wholes? 10 wholes?
Show or explain how you know.

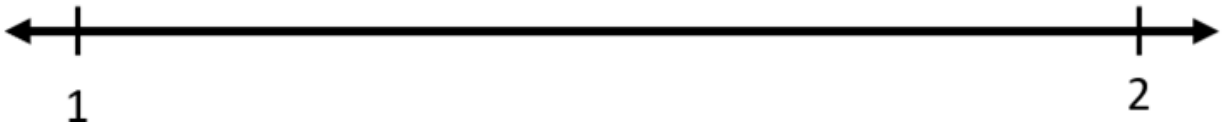
7. What fraction is at Point A on the number line? Write it as a fraction and a mixed number.




8. Show where 11/8 belongs on the number line below:




9. Show roughly where 5/4 should go on the number line below.



10. Write the numbers below in order from least to greatest. Show your thinking.

$1\frac{2}{3}$ $\frac{8}{3}$ $1\frac{3}{4}$ $2\frac{1}{3}$ $2$

11. Which is bigger: 3 ⅔ or 14/3? Explain or show your thinking.

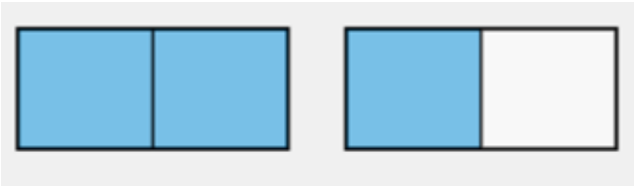
12. Complete the table. Show your thinking.

| Mixed Number | Improper Fraction |
|---|---|
| $3\frac{1}{2}$ | |
| | $\frac{9}{4}$ |
| $2\frac{3}{7}$ | |
| | $\frac{18}{5}$ |
| **Challenge:** $17\frac{8}{9}$ | |

13. Draw a picture to show the difference between three quarters and four thirds. Write an inequality statement to compare the fractions.

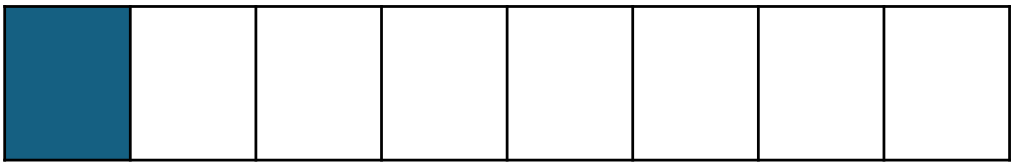
14. Use division to convert 22/5 into a mixed number. Check your answer with a picture.

15. What fraction is showing here? Is there more than one answer? Explain.



16. With pattern blocks, if two hexagons is 1 whole, how much is 8 triangles? What about 3 trapezoids? What about 1 triangle?

17. Colour one whole if the shaded section is 1/5. How much would it be if the whole rectangle was shaded?



18. How many sevenths make up one whole? Two wholes?

19. Using Cuisenaire Rods (pictured below):
a. If the dark green rod is 1 whole, how much are the other rods worth?
b. what about if the light green rod is 1 whole?

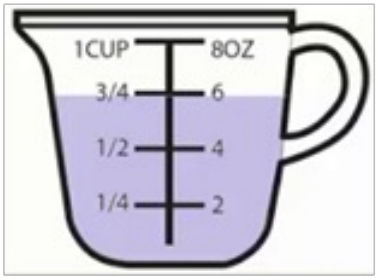
20. Jayden read 3 2/5 pages of his book yesterday, and 19/4 pages the day before. On which day did he read more? Show your thinking.

21. Put the following numbers on a number line. Show your thinking.

$2\frac{1}{4}, \frac{14}{5}, 3\frac{2}{5}, 2, 2\frac{1}{2}$

22. What two whole numbers is 34/6 between? Draw a number line to show your thinking.

23. Write a mixed number and improper fraction to show how many cups altogether. Draw or write to explain your thinking.


24. A recipe calls for 2 ¼ cups of flour but you only have 1 ½ cups. How much more flour do you need?

25. How much time is 2 ¾ hours?

26. Sophie saw on a very strangely written recipe that she needed 33/4 cups of milk. Convert that measurement into a mixed number to make it easier for Sophie.

27. Do 1 1/2 and 9/6 represent the same amount?
Show your thinking with pictures and numbers.

28. Make a number line and place these fractions on it:
3/6 , 1 1/3 , 3/2.
Think carefully about how to partition the number line.

29. Your neighbor has 3 1/2 dozen eggs in their fridge. You have 50 eggs. Who has more? How do you know?

30. Skip count by ⅔ until you get to a number that is equivalent to 4.

31. Is 2 ¾ and 7 ⅚ more than 10 or less than 10?
How do you know?

32. A 2-cup measuring cup is filled to 1 ¼ cups.
How much room is left in the measuring cup?

33. Addie said she is 6 ¾ years old. In how many months will Addie turn 7?

34. Your class is designing a rectangular garden for the front of the school. The area of the garden needs to be 20 square metres. If one side length of the garden is going to be 2 1/2 metres, what will the perimeter be?

COASTMETRO
ELEMENTARY MATH PROJECT

# GRADE 6 IMPROPER FRACTIONS & MIXED NUMBERS OPEN QUESTIONS

1. Write two mixed numbers that are between 2 and 3.

2. Write two mixed numbers that are between 2 and 2 ¼.

3. Write two improper fractions that are really close to 4. How do you know they are really close?

4. Write the smallest mixed number you can think of. Could there be a mixed number even smaller than the one you chose? Explain or show your thinking.

5. Write an improper fraction that is between 1 7/8 and 2 1/4. Show how you know.

6. When can finding a common denominator help you compare improper fractions or mixed numbers? Explain and give an example.

7. Choose ten or more fractions between 1 and 3.
Record these fractions as improper fractions and mixed numbers.
Record the fractions in order from least to greatest along a number line.

8. Here is a list of benchmark numbers in order: 0, 0.5, 1, 1.5, 2

a. Draw a number line with these benchmark numbers on it and then add these numbers to it:

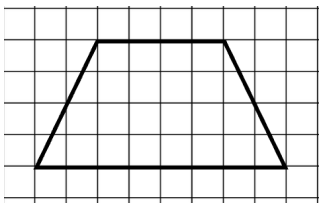
3/4, 0.2, 8/10, 0.45, 17/10, 1.51, 1/4, 0.89, 130/100, 1⁄4.

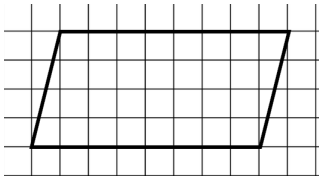
b. Add two or more fractions or decimal numbers of your choosing. Explain or show your thinking.

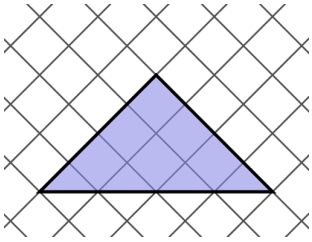
9. Choose one of these numbers: 18/10 or 2 3/4

a. Represent the number in different ways (pictures, words, symbols).
b. How many different ways can you decompose the number?
c. What different ways can you count to that number?
d. What is 0.5 more than your number?
e. What is 0.5 less?
f. What is a number that is about half of your number?
g. Show your number on a number line then write six other numbers putting them all in order.

1. Find the area of each shape on the grid.



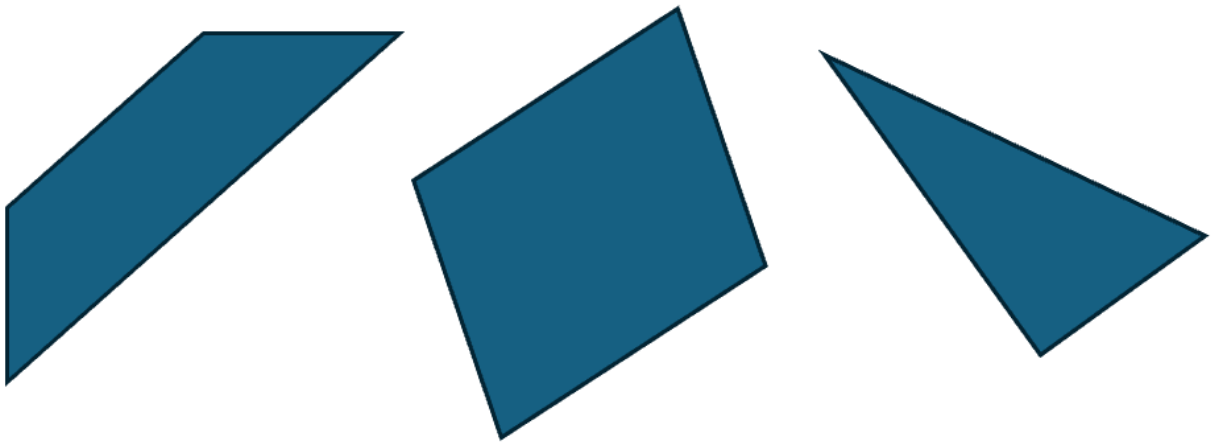




2. A triangle has a height of 4 cm and a base of 5 cm.
a. What is the area of the triangle?

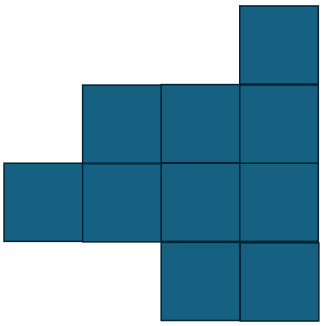
b. If you put 2 of the triangles together, what would be the area of the parallelogram they create?

3. Find the area of each shape.

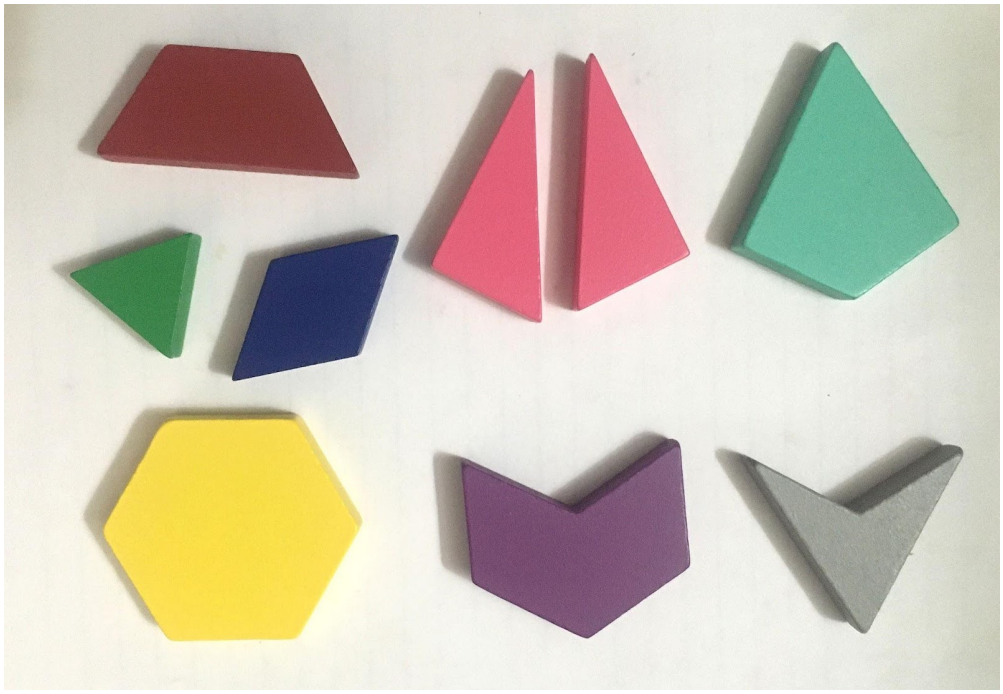


4. A farmer has a rectangular field, with a length of 115 meters and a width of 82 meters. The farmer wants to build a fence across the diagonal to create 2 triangular fields, so they can keep goats on one side and cows on the other. What will the area of each of the new triangular fields be?

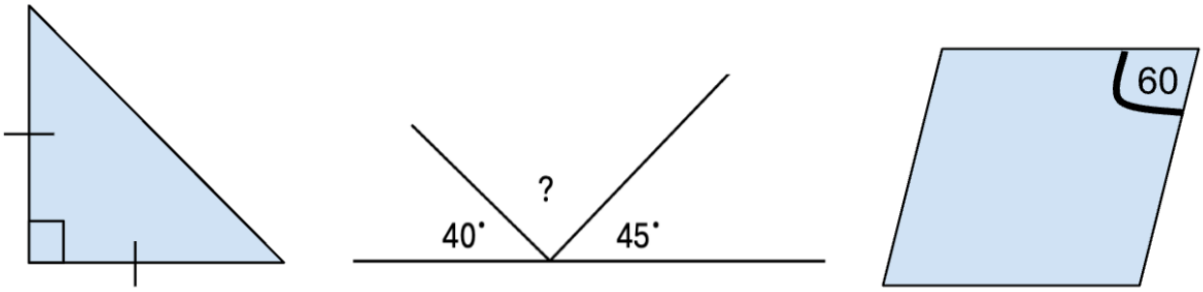
5. Determine the perimeter of the shape below if each square has a side length of 2 cm. Can you arrange the squares into a different shape that has the same perimeter?



6. Measure and name each of the angles in this shape.



7. Find the missing angle measurements.



8. Draw two different triangles that each have the same area. Explain the strategy you used to create the drawings.

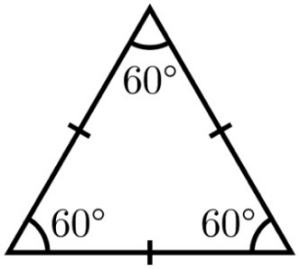
9. Use pictures, numbers and words to explain how finding the area of a parallelogram is similar to finding the area of a rectangle.

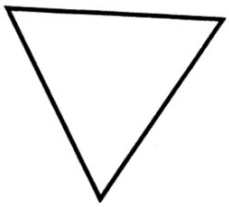
10. Build a shape using at least 6 pattern blocks:
a. Determine the length of the perimeter.
b. Measure each of the angles in the shape.
c. What strategy would you use to determine the area?

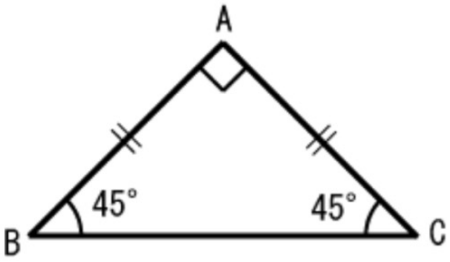
1. Draw an example of each angle (acute, obtuse, reflex, straight or right) or draw a shape that includes at least one of each type of angle.

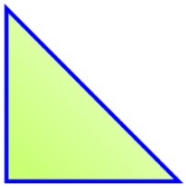
2. Draw examples of the six different types of triangles. Label each triangle with its angle and side measurements and include the name of the type of triangle.

3. Look at these triangles.
a. What kinds of triangles are not represented in the set?
b. Which types of angles are not represented?

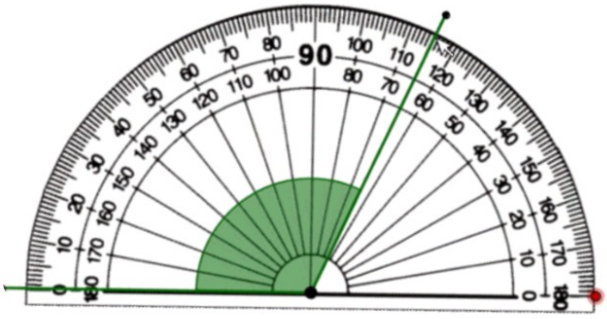




4. One student says that the angle below is 115 degrees and another says that it is 65 degrees. Which student is correct?



5. Label each set of triangle attributes as possible or impossible.
Draw or use materials to help you test each one.
a. A triangle with 2 obtuse angles.

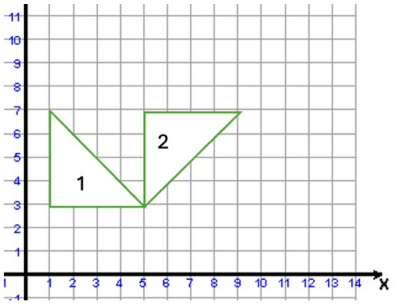
b. A triangle with 3 60 degree angles.

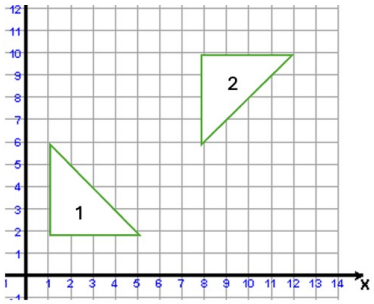
c. A triangle with 1 right angle and 2 sides that are each 3 cm long.

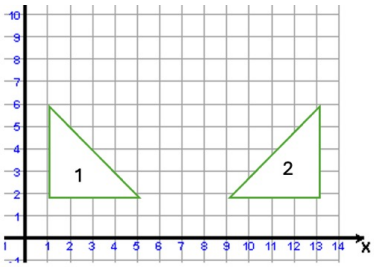
d. A triangle with 2 acute angles.

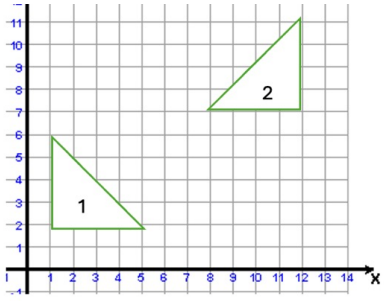
e. A triangle with a 210 degree angle.

6. Describe each of the transformations in the images below. There may be more than one transformation required for the shape to get to position 2.



7. Draw a shape on the Cartesian Plane. Perform at least 3 different transformations using the shape. Describe each transformation.

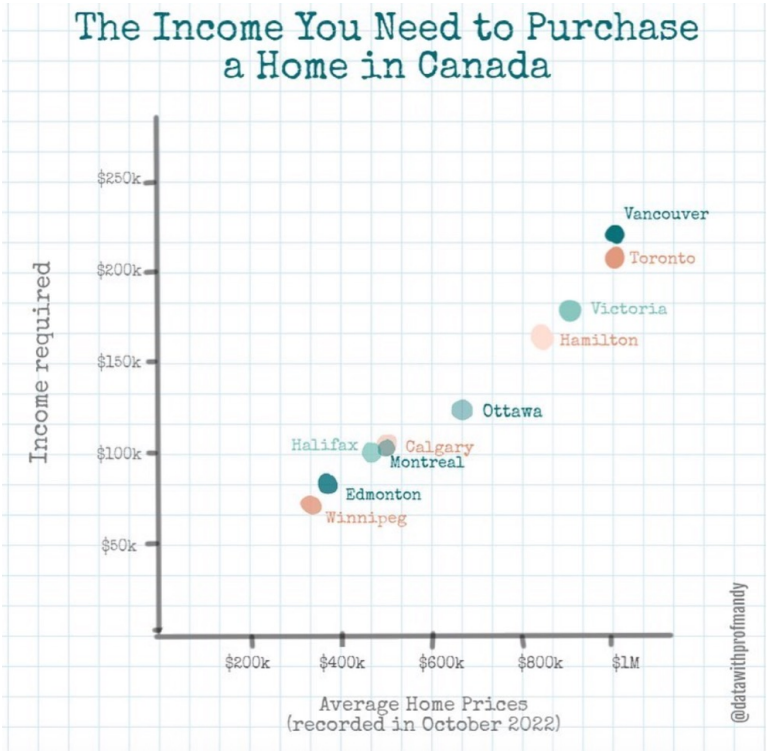
8. Create 2 triangles using materials or drawings. How are they the same? How are they different? Measure and label the sides and angles. How does this information help you classify each triangle?

9. Ari tells Lochlan that all equilateral triangles are the same, but that the other kinds of triangles are all different. What does she mean by that? Do you agree or disagree?

10. Create an art project (drawing, painting, model) with a variety of objects/shapes. Your drawing must include at least 6 transformations (rotation, reflection, transformation). Some of these transformations should be sequential (more than one transformation of the same shape. Write a journal to describe your piece that explains how you used the transformations to create it.

1. Which of these options would be graphed as a line graph?
a. The growth of a pet.
b. How many people like strawberry, chocolate or vanilla ice cream.
c. Average summer temperatures in your town.
d. The lifespan of different species of animals.
e. The speed of a car over the course of a trip.

2. According to the graph below:
a. Which city has the most expensive houses?
b. What is the income required to buy a house in Halifax?
c. How much is each line of the graph worth on the Y axis? On the X axis?
d. What would this data look like in table form?

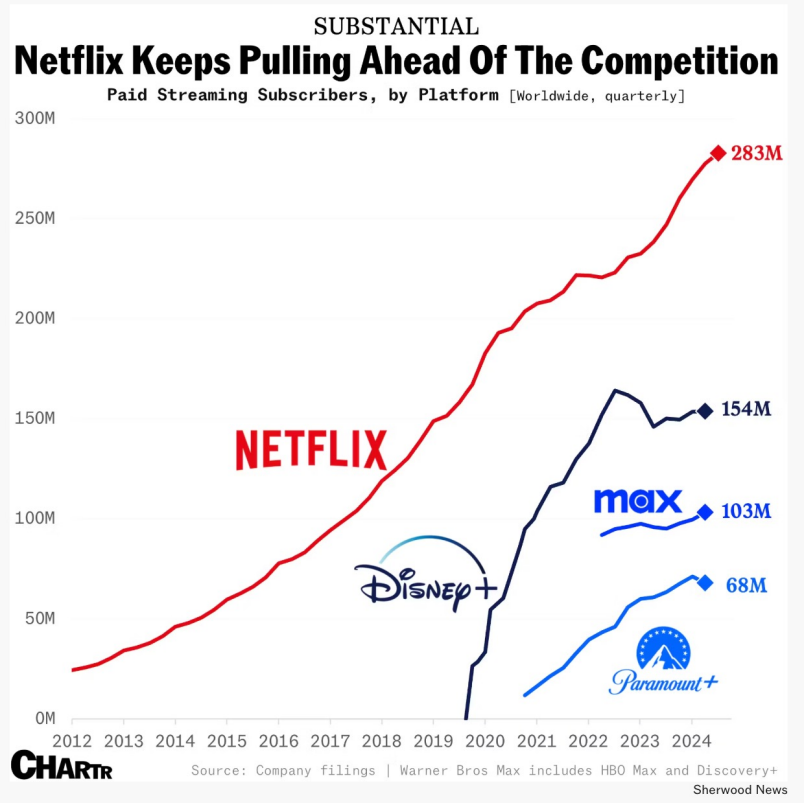


3. Create a line graph using the data in the table below.
a. What relationship is this data showing?
b. What happens in week 4?
c. How much money did the person save by the end of the 5 weeks?

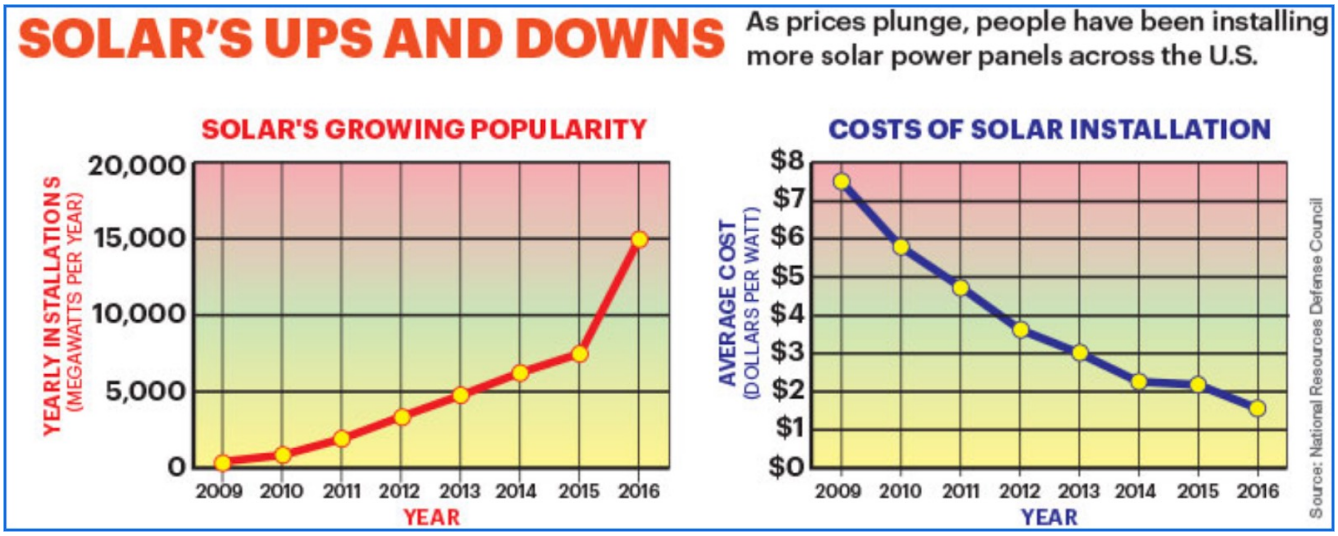
| Week | Savings Account Balance |
|---|---|
| 1 | $100 |
| 2 | $200 |
| 3 | $350 |
| 4 | $300 |
| 5 | $400 |

4. Line graphs are used to measure change over time. Record the temperature outside every hour for 12 hours. You can use a thermometer outside or a cell phone or find the temperature online. Create a line graph with the time of day in one-hour increments on the x-axis and the temperature in degrees Celsius on the y-axis.

5. Examine the graph below.
a. What is being compared in the graph?
b. What does the horizontal axis represent? What does the vertical axis represent?
c. What observations can you make about what is happening in the graph?



6. Look at the graphs below. How are they related?
What story do they tell about the use of solar energy?



7. The graph below shows a sharp peak in searches for fidget spinners in the month of May. Redraw the graph using a scale that makes the peak look less extreme.

8. Think of a situation where data could be collected that can be represented as a line graph (change over time). Collect enough data to plot at least 6 points on a graph and create a line graph using the data.

a. Explain how you chose the scale on your graph.

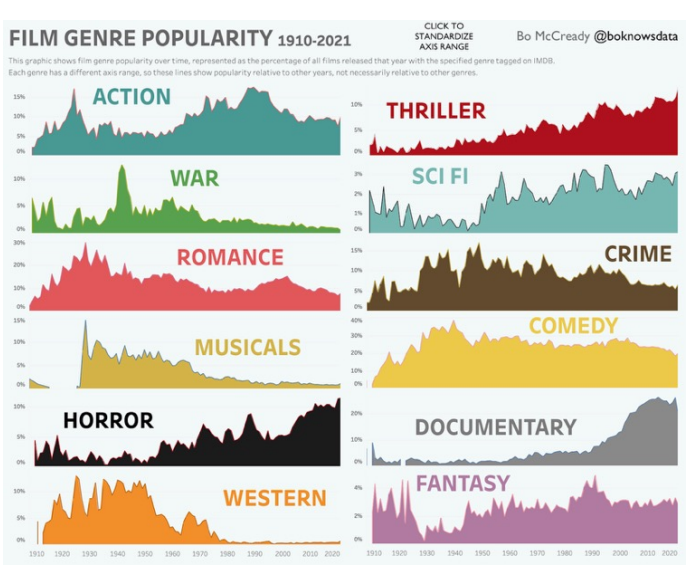
b. What observations can you make from the line graph that were not obvious when you only had the data as numbers?

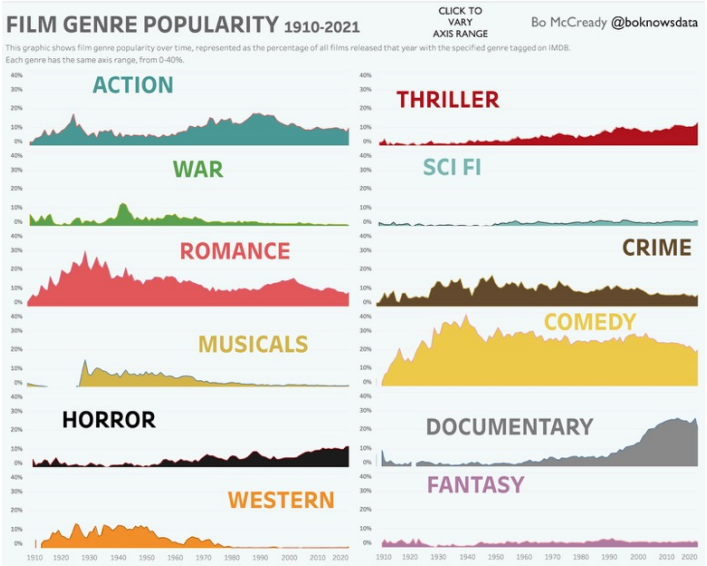
c. What observations and inferences can you make from your graph?

d. Predict what will happen if you continue to collect data.

9. Explain the difference between graphing data as a scatter plot versus graphing data as a line graph? Why would you choose one type of graph or another for a particular data set?

10. The graphs below show the same data, but the scales are different. In the first graph, all of the scales are different for each genre. In the second graph the scales are all the same. How does changing the scale effect how we read the data in the graph?



1. Look at this spinner.


a. What is the probability of spinning a 3?

b. Represent the probability as a fraction.

c. What is the probability of spinning an odd number?

d. Represent the probability as a fraction, percentage and a decimal number.

2. The theoretical probability of an outcome is 2/4.
a. What does the 2 mean?

b. What does the 4 mean?

3. What is the theoretical probability of rolling a 6 on a standard six-sided die?

Roll a die 30 times and record the results.  What was your experimental probability for rolling a 6?

4. List the theoretical probabilities for each of the numbers below being drawn from the cards in this set.

a. 10

b. 6

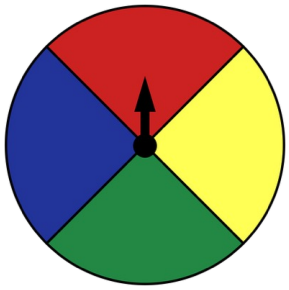
c. 5

d. 10 or 6

5. Anisha calculated that if she rolled a 6-sided cube 36 times she would get a one 12/36 times, a two 6/36 times, and a three 18/36 times. How many of each number are on the cube?

6. There are 20 buttons in a jar. 3 are red, 7 are blue, 5 are white, 2 are white and 3 are brown. What is the probability that you will draw a white button on your first try?

7. What kinds of questions could you ask about probability using this spinner?

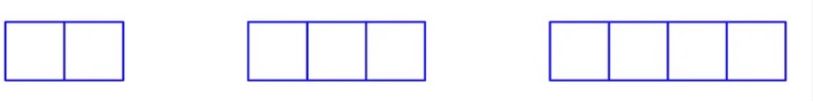


8. Explain the difference between theoretical and experimental probability. Why are they not always the same?

9. Is Rock, Paper, Scissors a fair game? How can calculating the theoretical probabilities help you determine if the game is fair? Play 10 rounds with a partner. What factors effected the experimental probabilities? How do the experimental and theoretical probabilities relate to each other?

10. Invent a game where you can win or lose. Calculate the theoretical probability that you will win. Play the game with a small group or partner. How does the experimental probability compare to the theoretical. What would happen to that relationship if you played the game one hundred times?

1. For each growing visual pattern:
a. What is changing?
b. What is growing?
c. Draw what comes next?
d. Create a table of values that represents the information.
e. What will the 10th term be?



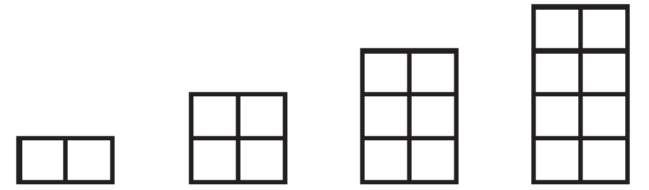


Figure 1 Figure 2 Figure 3 Figure 4

2. Draw a line from the pattern to the formula to match each pattern with its composite general rule.

| | |
|---|---|
| 2,3,4,5, ... | 4n + 2 |
| 34, 33, 32, 31, ... | n + 1 |
| 6, 10, 14, 18, ... | 35 -1 |

There are two types of pattern rules:
Recursive: rules that tell you how to determine each term from the previous terms.
Composite: rules that tell you how to make the sequence directly from the term number.
An algebraic expression is used to represent the pattern

3. Which type of rule is this? Start at 6 and add 2 each time to create a sequence.
a. Create the sequence.
b. Write a composite general rule for making the sequence directly from the term number.

4. Write both types of rules (recursive and composite) for each sequence.
a. 98, 85, 72, 59, ...

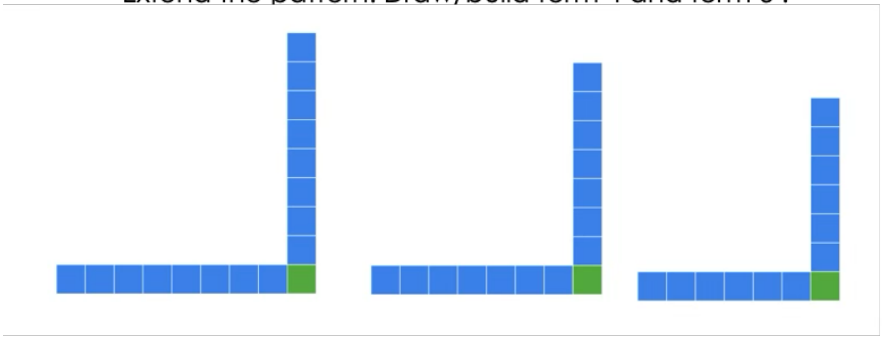
b. 7, 13, 19, 25, ...

c. 3, 6, 9, 12, ...

# Exploring the L-Pattern

**How do you see the pattern growing?**

Extend the pattern. Draw/build term 4 and term 5 .



**Term 1** **Term 2** **Term 3** **Term 4** **Term 5**

Create a T-Chart that represents the pattern.

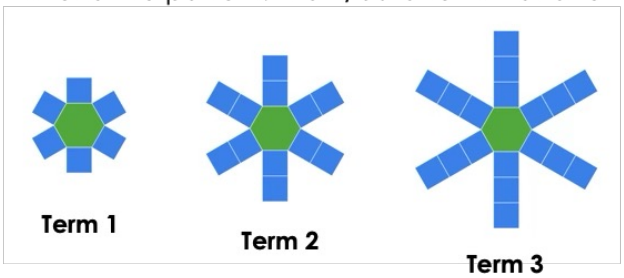
| Term Number | Total Number of Pieces |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

What is the general rule for this pattern? How do you know?

# Exploring the Hexagonal Sun Pattern

**How do you see the pattern growing?**

Extend the pattern. Draw/build term 4 and term 5 .




**Term 4**

**Term 5**

Create a T-Chart that represents the pattern.

| Term Number | Total Number of Pieces |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

What is the general rule for this hexagonal sun pattern? How do you know?

5. One flowerpot costs $47.
a. How much does it cost to buy 2 flowerpots? 3 Flowerpots?

b. Make a table of values to represent the number of flowerpots and cost.

c. Use the pattern to predict the cost of 20 flowerpots.

d. Write a pattern rule for the cost and use it to determine what the cost of 150 flowerpots would be.

6. A certain marigold variety can grow up to 240 cm tall. It grows 20 cm each week, starting at 0 cm when it first appears.
a. In which week will the marigold first reach 240 cm? Explain your reasoning.

b. How tall will the marigold be at the end of Week 7?

c. Make a table showing, *Week Number* and *Height (cm*). What kind of pattern is this?

7. What Is the Same? What Is Different?
Sequence A: 2, 5, 8, 11, 14...
Sequence B: 20, 17, 14, 11, 8...
Describe what's the same about these two sequences and what's different. Justify your thinking using math. For example, you can use tables, graphs, rules to show your thinking.

8. True or False? *Every growing sequence can also be seen as a decreasing (shrinking) sequence if you read it backwards*. True or false? Provide two examples or counterexamples and explain.

9. What's My Rule? I have a sequence where each term equals the previous term multiplied by 1.2 then minus 3. My first term is 10.
a. Write out Terms 1 through 5.

b. Explain in words how the pattern grows or shrinks.

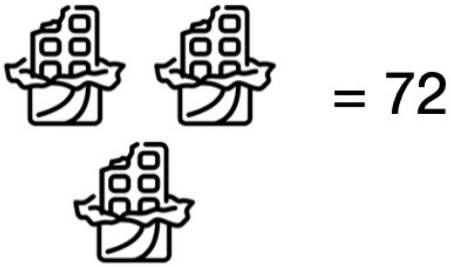
c. Could this ever produce a term that is exactly 0? Why or why not?

10. Create an increasing pattern where Term 2 has 8 circles and another term has 24 circles. Represent the pattern in at least 3 other ways (e.g., picture, table of values, graph, pattern rule to show which term has 24 circles).

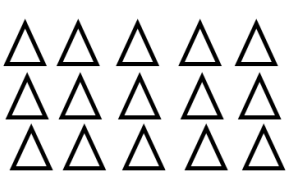
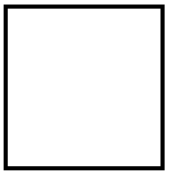
11. Emma puts aside money each week into her “future fund.” Her plan:
In Week 1 she saves $5.
In Week 2 she adds $2 more than she did in Week 1.
In Week 3 she adds $2 more than she did in Week 2.
And so on…each week’s deposit is $2 more than the previous week’s.
Create a table of values showing how much Emma deposits in Weeks 1 through 6
Plot these deposits on a graph (Week on the horizontal axis, Deposit on the vertical).
Describe the pattern in words. What’s the “rule” for finding Week n’s deposit?
Use your rule to predict how much she will deposit in Week 10.
Calculate the total amount Emma will have saved after 10 weeks.

1. Determine the value of each candy. Show your thinking.

a.  + 17 = 38

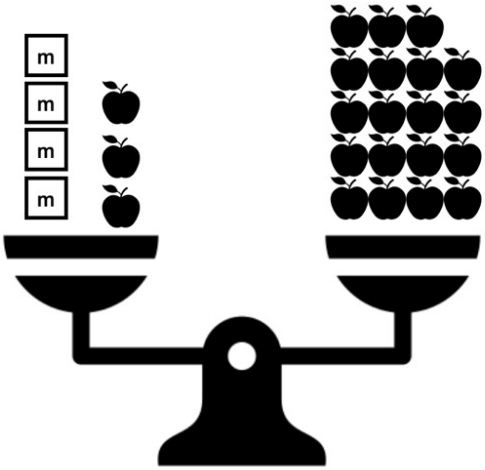
b.  = 72

2. What equation represents the picture? How many triangles are in the box?

 = △ △ △ + 

3. What number added to 7 gives 23? Write an equation to represent the problem, then solve using inspection.

4. Write an equation to represent the pan balance. Solve the equation to find the value of the unknown (m).




5. Guess and test to find the solution.

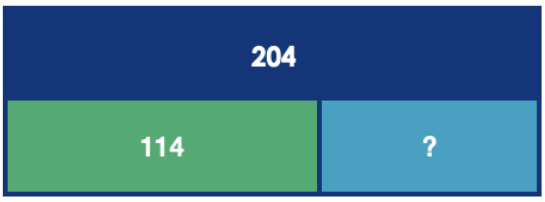
a. 38 = 8 + x

b. 48 = 2x

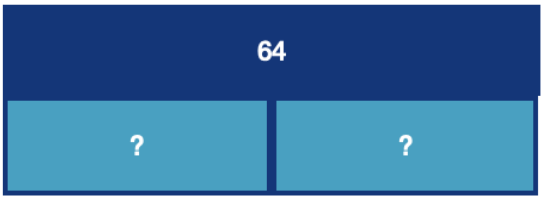
# Using Bar Models to Represent and Solve One-Step Equations

Use the following bar models to create an equation in two different forms. Then, solve the equations.

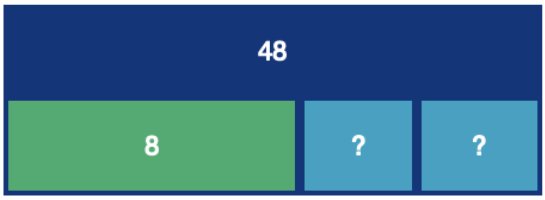

| | |
|---|---|
| Equation One | |
| Equation Two | |
| Solution | |




| | |
|---|---|
| Equation One | |
| Equation Two | |
| Solution | |




| | |
|---|---|
| Equation One | |
| Equation Two | |
| Solution | |




| | |
|---|---|
| Equation One | |
| Equation Two | |
| Solution | |

Draw a bar model that represents the following equations and solve.

| Equation | $3 + c = 20$ |
|---|---|
| Bar Model | |
| Solution | |

| Equation | $18 = 4 + n$ |
|---|---|
| Bar Model | |
| Solution | |

| Equation | $y = 6 + 2$ |
|---|---|
| Bar Model | |
| Solution | |

| Equation | $30 = a + 5$ |
|---|---|
| Bar Model | |
| Solution | |

6. Solve each equation using algebra tiles, then check your solutions using another method.

a. $x + 4 = 9$

b. $2y = 12$

7. Solve each equation using a strategy of your choice. Show your thinking. Which strategy did you use? Why?

| | |
|---|---|
| a. $p + 3 = 26$ | b. $18 = n + 2$ |
| c. $74 = y - 15$ | d. $6b = 42$ |
| e. $9 = 45 \div p$ | |

8. Find the number that goes in place of each symbol or variable to make a true statement.

| | |
|---|---|
| a. 20 – z = 15 | b. 🔺 ÷ 7 = 2 |
| c. 8🟦 = 4 | d. 13t = 9 |

9. Write a mathematical statement for each of the word sentences.

a. A number plus 7 is equal to 9.

b. Twenty-five plus two times a number is seven.

c. The sum of three times a number and four is equal to thirty.

10. Create a picture to model the equation, $4n + 2 = 8$

11. Write an equation that can be used to solve the problem.
"Who am I?"
a. After adding 12 t both sides of my equation, I became $x = 20$. What is my original equation?

b. After dividing both sides of my equation by 7, I became $n = 2$. What was my original equation?

12. Match each equation on the left with an equivalent form of it on the right by drawing an arrow from left to right. The first one is done for you.

| | |
|---|---|
| x + 8 = 17 | x = 7 |
| x – 6 = 9 | x + 4 = 10 |
| 5x = 35 | x + 3 = 12 |
| x4 = 6 | 12x = 96 |
| 7 + x = 13 | x = 24 |
| 12 = x - 5 | x – 2 = 13 |
| 6x = 48 | 20 = x - 3 |

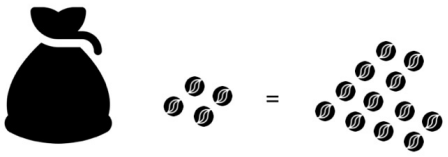
# SOLVING STORY PROBLEMS USING EQUATIONS

Select five of the following story problems to solve in your math notebooks. Design equations to help you find the solutions and use multiple strategies to determine the solutions. Answer the problems using a full sentence.

1. The difference between two numbers is 67. If the larger number is 125, what is the smaller number?
2. The aquarium has a total number of 145 fish. After some fish were adopted, 89 fish remained. How many fish were adopted?
3. A carpenter has a board that is 244 cm long. If she cuts off 68.5 cm, how many cm of board will be left?
4. Jagpreet's piggy bank has three times as many quarters as her brother's bank. If her brother has 12 quarters, how much money does Jagpreet have in her piggy bank?
5. Marcus is saving money for a new video game that costs $78. He already has saved one-third of the amount he needs. How much money has Marcus saved so far?
6. The length of a rectangle is 5 times its width. If the length is 45 cm, what is the width of the rectangle?
7. Emma's age is half her mom's age. If her mom is 38 years old, how old is Emma?
8. A bakery makes cookies in batches. If 7 batches produce 84 cookies, how many cookies are made in one batch?
9. The distance from Jake's house to school is 2 times the distance from his house to the park. If the distance to school is 16 blocks, how many blocks is it to the park?
10. The school garden has several vegetable beds. Each bed goes 6 tomato plants. If there are 42 tomato plants in total, how many garden beds are there?
11. Your class of 26 students is planning a field trip to Science World. The total coast for all students is $923. If each student needs to pay the same amount, create an equation to find out how much each should pay.
12. You're helping organize books at the library. You notice that when 15 books are placed equally on each shelf, the shelves look full. If you have 90 books, how many shelves will you need?
13. The school cafeteria is planning lunch for a group of students who won a math contest. They know that each table seats 8 students. Write an equation to help them determine how many tables they need. Test your equation with 56 students.
14. A local animal shelter spends $35 per week to care for each cat. If their weekly budget for cat care is $420, how many cats can they care for at the shelter?
15. A group of friends is sharing the cost of a pizza party. The total cost is $84. Determine each person's share, if 12 people share the cost.

13. How many marbles are in the bag? How do you know? When there is more than one bag, each bag contains the same number of marbles.

a.




b.

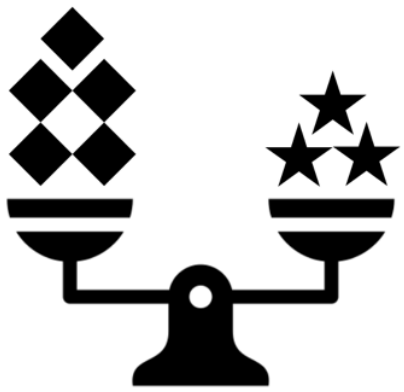

14. Show three ways to solve each equation. Represent your thinking using pictures, symbols and words.

a. $a - 3 = 15$

b. $3p = 45$

15. Which method of solving one-step equations do you prefer (e.g., guess and test, inspection, bar model, balance, algebra tiles, etc.)? Show an example to explain your choice.

16. What could the value of each symbol be? Explain your thinking.



# Linear Equations Math Menu Task

Build as *few* linear equations as possible to satisfy each rule at least once.

| | | | |
|---|---|---|---|
| A. | The equation has a variable on one side of the equality | B. | The right side of the equation is 22 |
| C. | The solution is greater than 15 | D. | The equation contains no constant terms |
| E. | The equation has a coefficient that is divisible by 3 | F. | The solution is a prime number |
| G. | All constants and coefficients are odd numbers | | |

*Which rules pair nicely?*
*Which rules cannot be paired?*

Describe how you built each linear equation.
Be sure to identify which linear equations you designed satisfy which rules.

1. Liam buys 5 notebooks for $3.75 each and a pen for $1.25.
How much does he spend in total?

2. Ava pays $10 for a snack that costs $6.45. How much change should she receive?

3. Jordan has $20. He wants to buy a book for $12.50 and a toy for $9.75. Does he have enough money? How much change will he get or how much more money does he need?

4. Lina gets an allowance of $10 per week. She saves half of her allowance in her college fund. Her parents also contribute $100 to the fund every week. How much money will Lena have in her college fund in 5 years?

5. You and 3 friends are eating at your favourite restaurant. The bill comes to $100. If you each pay 25%, how much will your part of the bill be?

6. You have decided to get a summer job to earn some spending money. Minimum wage is $15.20 per hour. There is an opening at a farm stand where you could work 8 hours per day for minimum wage 5 days per week. Another option is a job that pays $1 per hour more than minimum wage, but you only work 4 days per week. Which job will earn you more money over the summer?

7. You are buying supplies to make cupcakes for the school bake sale. You buy flour for $5.65, eggs for $7.99, sugar for $5.55, milk for $6.50 and vanilla for $7.99. You can sell the cupcakes for $1.50 each.

a. How many cupcakes must you sell to make a profit?

b. You are baking the cupcakes in batches of a dozen. What is the minimum number of batches you must make? What will your profit be from that number of batches?

8. You have $50 to spend on school supplies. What items could you buy? Make a list and explain how you stayed within your budget. Use local store flyers or search online for the prices of the supplies you want to buy.

9. You want to save $100 to buy a new scooter. What are some ways you could earn and save money over time? Create a plan.

10. Imagine you are planning a small party with a budget of $150. What would you include in your budget (food, decorations, games)? How would you make sure you don't overspend? Use local store flyers or search online for the prices of the supplies you want to buy.

COASTMETRO
ELEMENTARY MATH PROJECT

# GRADE 6 MIXED REVIEW

1. How many thousands are in one million?

2. How many millions are in a billion?

3. Write two decimals that are between ½ and ¾.

4. How many hundredths are in a tenth?

5. Write 16% as a fraction in lowest terms.

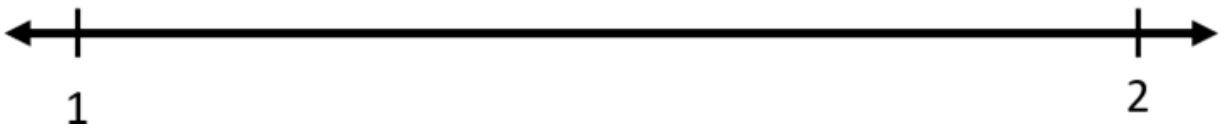
6. Place the following numbers in order from least to greatest:
0.2, 0.22, ⅞, ½, 1, 60%

7. How many fifths are in two wholes?

8. Write 8 hundredths as a fraction, decimal and percent.

9. Elsie was making oatmeal in the morning for her family. For two servings, the recipe calls for 1.5 cups of water and 1 cup of oats. How many cups of water and oats would she need for four servings?

10. Place 1.5, 5/4, 1.1 and 7/4 roughly where you think they belong on the number line below.



11. How many numbers are there between 0 and 1? How do you know?

12. Write 6:15 in lowest terms. Is it possible to write this ratio as a fraction without knowing whether it is part-to-part or part-to-whole? Explain.

13. Will 0.7 x 1.6 give a product that is greater than 1.6 or less than 1.6? Explain.

14. Is 6/5 greater than 1 or less than 1? How do you know?

15. How many thirds are in 5 ⅓? How do you know? Write 5 ⅓ as an improper fraction.

16. Alex was so excited to finally get the new book he wanted, that he read 50 pages on the first day! Every day after that, he read 10 pages. Write a pattern rule to show this. Use a table of values to figure out how many pages Alex would have read after a week. If the book has 278 pages, how long would it take him to finish it?

17. Create 3 different shapes that have the same perimeter length. What is the area of each shape? Measure and label all of the sides and angles.

18. Ben wants to build a fence around an area of approximately $100m^2$.
a. Draw some possible shapes for the fence and include the length of each side.
b. Ben has the choice of using 3m boards or 4m boards for the fence. 3m boards cost $7.49 each and 4m boards cost $8.99 each. What is the least expensive way that Ben can build the fence?

19. Soriah needs to roll a number greater than 16 on a 20-sided dice, so her character won't take damage.
a. What is the theoretical probability that she will roll what she needs?
b. Show the probability as a fraction, decimal and percent. Is it possible to show it as a ratio?

20. Which tin of candy would you rather buy? Use pictures, numbers and words to explain your thinking.