**Review Problems for Benchmark 1 Key (answers in red)**

1. List the properties of each step in solving the following equation:

5(x + 3) = - 4 Given

5x +15 = - 4 Distributive Property

5x = -19 Subtraction Property of Addition

X = - $\frac{19}{5}$ Division Property of Addition

1. Write in three forms:
2. $\sqrt[3]{10}$ 101/3 ($\sqrt[3]{10}$ )1
3. ($\sqrt[10]{25}$ )5 255/10= (52) 5/10 = 510/10 =5
4. 52/7 ($\sqrt[7]{5}$ )2 $\sqrt[7]{5}$ 2
5. Which of the following sets are functions? Justify your selection. Determine the domain and the range of each relation.
6. $\left\{\left(-4,-3\right)\left(-2,-2\right)\left(0, 1\right)(1, -{1}/{2)}\right\}$
7. $\left\{\left(0,0\right)\left(1,1\right)\left(4,2\right)(1,-1)\right\}$
8. $\left\{\left(1,-1\right)\left(3,4\right)\left(5,4\right)(7,6)\right\}$
9. $\left\{\left(3,-2\right)\left(1,0\right)\left(0,-1\right)\left(0,0\right)\right\}$
10. D:{ -4, -2,0, 1} R: {-3,-2,1,-1/2}
11. D:{ 0, 1,4, 1} R: {0,1,2,-1}
12. D:{ 1, 3,5,7} R: {-1,4, 4, 6}
13. D:{ 3, 1,0, 0} R: {-2,0,-1,0}

a and c are functions (no input has two different output values)

b and d are not functions (for one value in the domain, there are two different values in the range)

1. Sara is organizing a festival for the City Hall. She orders 600kg veggies, 400lb chicken, 500 ice-cream sandwiches 2oz each and 150 French baguettes 8oz each. The food is loaded on pallets holding 150lb each. What is the minimum amount of pallets used to load the food?

600kg = 1323lb

500 ice-creams \*2oz = 62.5 lb

150 breads\*8oz = 75lb

1323+400+62.5+75 = 1860.5lb of food

1860.5 lb/150lb/pallet = 12.4 pallets

Therefore, Sara will need at least 13 pallets to transport the food.

1. In a collecting vase, there was water 2 inches high. If it rains at a rate of 1.5in per hour for 6 hours, what is the height of the water in vase after the rain? Describe the situation using an input-output rule.

f(x) = 1.5 x +2

f(6) = 1.5(6)+ 2 = 11 inches of water will be in the vase after 6 hours.

1. Calculate the value of x for which the following equations are true.
2. – 4(3 + 4x) = 3(5x +5)

-12 – 16x = 15x + 15

-27 = 31x

x = - 27/31 ≈ -0.871

1. 9x + 4 - 5x = 3(x – 4)

4x + 4 = 3x – 12

x = -16

1. – (1 + 7x) – 6(- 7 – x) = 36

-1 – 7x + 42 + 6x = 36

- x + 41 = 36

- x = - 5

 x = 5

1. A stack of 12 bricks is 27 inches tall. Describe this as a NOW-NEXT relation and write an Input-Output equation. Using the equation you created, predict how tall a stack 0f 53 bricks will be.

Height of a brick: 27/12 = 2.25 in

f(x) = 2.5 x

f(53) = 2.5 (53) = 119.25

1. Mark planted flowers along a border of a triangular garden of sides 15, 36, 39 ft. Is the garden shaped as a right triangle or not?

152 + 362 = 392

225 + 1296 = 1521

1521 = 1521 therefore, the garden is a right triangle

1. The volume of a frustum of a right circular cone is given by the formula:

V = $\frac{πh}{3}$(R2 + Rr +r2) h = 3V/π(R2 + Rr +r2)

1. John has chopped 7.5lb of walnuts. If he chops at a rate of 1.5 lb per hour, how many more hours will it take him to chop until he will have 12lb of chopped walnuts?

f(x) = 1.5x (12-7.5) = 4.5lb 4.5= 1.5(x) x = 3 hours

1. A bakery collected data on their sourdough bread sells for the last two weeks. They sold 43, 39, 17, 38, 50, 12, 34, 28, 37, 42, 40, 10, 75, 33. List the five number summary, determine the IQR and create a box plot for the data. Is there any outlier? Calculate the standard deviation for this set of data?



IQR : 18.5

Outlier: 75

1. In a pumpkin launching contest the height of the launch is described by the function f(t) = - 16t2 + 50t + 20 where t is the amount of time measured in seconds. What is the practical range for the intervals of time 0,1,2,3,4,5 sec. Explain the meaning of f(0).

f(t) = - 16t2 + 50t + 20

f(0) = -16(02) + 50(0) + 20 = 20 (calculate for each element of the domain)

D : {0, 1, 2, 3, 4, 5 } R: {20, 54, 56, 26,-36, -130}

Practical range : {20, 54, 56, 26} -36 and -130 are not realistic values because the pumpkin will hit the ground before the 4th second.

1. 8th grade team at McFadden Middle School made a graph to represent number of lunch detentions during the first quarter. The following set of data was plotted on the graph: week 1-5 LD, week 2- 10 LD, week 3 – 26 LD, week 4 – 25 LD, week 5 – 6 LD, week 6 – 30 LD, week 7 – 35 LD, week 8 – 20 LD, week 9 – 40 LD. How does the graph of this data look? What was the average lunch detention for 8th grade during Q1? What is the average rate of change between week 3 and week 5?

Average: 5 + 10 + 26 + 25 + 6 + 30 + 35 +20 +40 = 21.88 ≈ 22 lunch detentions per day.

Rate of change: Δy/Δx = y2 – y1/ x2 – x1 = (6-26)/(5-3) = -10 Δ is negative, therefore the number of lunch detentions between week 3 and week 5 have decreased.

1. A hurricane center records the hourly speed of the winds as the hurricane approaches the coast.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| time | 2pm | 3pm | 4pm | 5pm | 6pm | 7pm | 8pm | 9pn | 10pm |
| speed (mi/h) | 30 | 38 | 48 | 62 | 80 | 105 | 116 | 127 | 136 |

What is the average rate of change in the speed of the winds from 2pm to 9pm?

Δy/Δx = y2 – y1/ x2 – x1 = (127-30)/(9-2) = 97/7 = 13.86 mi/h (the winds increase by 13.86 miles every hour)

1. a) If f(x) = |x| complete the table of values and make the graph that represent the function.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | - 4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| y | 4 | 3 | 2 | 1 | 0 | 1 | 2 | 3 | 4 |

Using the same domain, create a table of values and a graph for

b) f(x) = |x+2| c) f(x) = |x-3| d) f(x) = |x| + 3 e) f(x) = |x| - 2

f) Describe the transformations that f(x) = |x| undergoes during b (moved left 2 units), c (moved right 3 units), d (moved up 3 units), and e (moved down 2 units)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | - 4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| y | 4 | 3 | 2 | 1 | 0 | 1 | 2 | 3 | 4 |
| y=|x+2| | 2 | 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y=|x-3| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 1 |
| y=|x|+3 | 7 | 6 | 5 | 4 | 3 | 4 | 5 | 6 | 7 |
| y=|x|-2 | 2 | 1 | 0 | -1 | -2 | -1 | 0 | 1 | 2 |

