A.CED.A.1: Modeling Linear Inequalities 1

1   The number of fish in a pond is eight more than the number of frogs. The total number of fish and frogs in the pond is at least 20. If x represents the number of frogs, which inequality can be used to represent this situation?
    1) $x + 8x \geq 20$ 3) $x + 8x \leq 20$
    2) $2x + 8 \geq 20$ 4) $2x + 8 \leq 20$

2   The cost of a pack of chewing gum in a vending machine is $0.75. The cost of a bottle of juice in the same machine is $1.25. Julia has $22.00 to spend on chewing gum and bottles of juice for her team and she must buy seven packs of chewing gum. If b represents the number of bottles of juice, which inequality represents the maximum number of bottles she can buy?
    1) $0.75b + 1.25(7) \geq 22$ 3) $0.75(7) + 1.25b \geq 22$
    2) $0.75b + 1.25(7) \leq 22$ 4) $0.75(7) + 1.25b \leq 22$

3   Ashley only has 7 quarters and some dimes in her purse. She needs at least $3.00 to pay for lunch. Which inequality could be used to determine the number of dimes, d, she needs in her purse to be able to pay for lunch?
    1) $1.75 + d \geq 3.00$ 3) $1.75 + d \leq 3.00$
    2) $1.75 + 0.10d \geq 3.00$ 4) $1.75 + 0.10d \leq 3.00$

4   An ice cream shop sells ice cream cones, c, and milkshakes, m. Each ice cream cone costs $1.50 and each milkshake costs $2.00. Donna has $19.00 to spend on ice cream cones and milkshakes. If she must buy 5 ice cream cones, which inequality could be used to determine the maximum number of milkshakes she can buy?
    1) $1.50(5) + 2.00m \geq 19.00$ 3) $1.50c + 2.00(5) \geq 19.00$
    2) $1.50(5) + 2.00m \leq 19.00$ 4) $1.50c + 2.00(5) \leq 19.00$

5   Connor wants to attend the town carnival. The price of admission to the carnival is $4.50, and each ride costs an additional 79 cents. If he can spend at most $16.00 at the carnival, which inequality can be used to solve for r, the number of rides Connor can go on, and what is the maximum number of rides he can go on?
    1) $0.79 + 4.50r \leq 16.00$; 3 rides   3) $4.50 + 0.79r \leq 16.00$; 14 rides
    2) $0.79 + 4.50r \leq 16.00$; 4 rides   4) $4.50 + 0.79r \leq 16.00$; 15 rides

6   Two texting plans are advertised. Plan *A* has a monthly fee of $15 with a charge of $0.08 per text. Plan *B* has a monthly fee of $3 with a charge of $0.12 per text. If *t* represents the number of text messages in a month, which inequality should be used to show that the cost of Plan *A* is *less* than the cost of Plan *B*?
1) $15 + 0.08t < 3 + 0.12t$
2) $15 + 0.08t > 3 + 0.12t$
3) $15t + 0.08 < 3t + 0.12$
4) $15t + 0.08 > 3t + 0.12$

7   The math department needs to buy new textbooks and laptops for the computer science classroom. The textbooks cost $116.00 each, and the laptops cost $439.00 each. If the math department has $6500 to spend and purchases 30 textbooks, how many laptops can they buy?
1)   6
2)   7
3)   11
4)   12

8   Maria orders T-shirts for her volleyball camp. Adult-sized T-shirts cost $6.25 each and youth-sized T-shirts cost $4.50 each. Maria has $550 to purchase both adult-sized and youth-sized T-shirts. If she purchases 45 youth-sized T-shirts, determine algebraically the maximum number of adult-sized T-shirts she can purchase.

9   Sarah wants to buy a snowboard that has a total cost of $580, including tax. She has already saved $135 for it. At the end of each week, she is paid $96 for babysitting and is going to save three-quarters of that for the snowboard. Write an inequality that can be used to determine the minimum number of weeks Sarah needs to babysit to have enough money to purchase the snowboard. Determine and state the minimum number of full weeks Sarah needs to babysit to have enough money to purchase this snowboard.

10   A store sells grapes for $1.99 per pound, strawberries for $2.50 per pound, and pineapples for $2.99 each. Jonathan has $25 to buy fruit. He plans to buy 2 more pounds of strawberries than grapes. He also plans to buy 2 pineapples. If *x* represents the number of pounds of grapes, write an inequality in one variable that models this scenario. Determine algebraically the maximum number of whole pounds of grapes he can buy.

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Answer Section

1   ANS: 2
$x + x + 8 \geq 20$

REF: 012523ai
2   ANS: 4   REF: 081505ai
3   ANS: 2   REF: 062314ai
4   ANS: 2   REF: 062107ai
5   ANS: 3   REF: 011513ai
6   ANS: 1   REF: 012412ai
7   ANS: 1
$116(30) + 439L \leq 6500$

$439L \leq 3020$

$L \leq 6.879$

REF: 011904ai
8   ANS:
$6.25a + 4.5(45) \leq 550$ 55 shirts

$6.25a + 202.5 \leq 550$

$6.25a \leq 347.50$

$a \leq 55.6$

REF: 012026ai
9   ANS:
$135 + 72x \geq 580$ 7

$72x \geq 445$

$x \geq 6.2$

REF: 081833ai
10   ANS:
$1.99x + 2.50(x + 2) + 2(2.99) \leq 25$ 3 pounds of grapes

$1.99x + 2.50x + 5 + 5.98 \leq 25$

$4.49x \leq 14.02$

$x \leq \dfrac{1402}{449}$

REF: 082235ai