

Unit Exam: Linear Equations and Inequalities

Name:

Write each expression as an equation or an inequality: (5 points total, one point each)

- 1) c 4 more than a number is less than 8    a)  $x/7=10+2x$
- 2) a x divided by 7 is the same as twice x added to 10    b)  $42 \leq x+7 < 143$
- 3) d 9 is greater than or equal to n more than 3 divided by 4    c)  $x+4 < 8$
- 4) b The sum of a number x and seven is at least 42 AND less than 143    d)  $(n+3)/4 \leq 9$
- 5) e 4 times a number added to 3 is 9    e)  $3+4b=9$

Analyze each word problem and write the equation or inequality that describes the relationship. If necessary, solve for the unknown variables. READ PROBLEMS CAREFULLY. (each question is worth 5 points)

- 6) Emily wants to buy her mom a birthday present at the mall. She knows her mom wants a digital camera that costs \$119.00. She also wants to buy her mom some new candles for the house that cost 12.99 a piece. If Emily has \$182.00 to spend, write an inequality that will help Emily figure out how many candles she can buy. (Do not worry about tax)

$$182 \geq 119 + 12.99x$$

- 7) Three of Anne's friends helped her move into her new apartment. To show her appreciation, she wanted to take them out to the movies and pay for their tickets (and one for herself). She also needs to put in \$8.00 of gas in her car to drive to the movies. If the total cost of the evening was \$43.00, write an equation that would help determine the price of one movie ticket.

$$43 = 8 + 4x$$

- 8) Jerri has 3 children: Jen, Joe and Jill. Jen's age is 2 years more than 14 times Joe's age. Jill's age is 1 year less than twice Joe's age. Find each child's age if the sum of the ages is 35.

$$Joe = x$$

$$Jen = 2 + 14 * Joe = 2 + 14x$$

$$Jill = 2 * Joe - 1 = 2x - 1$$

$$Joe = 2 \text{ years}$$

$$Jen = 2 + 14 * 2 = 30 \text{ years}$$

$$Jill = 2 * 2 - 1 = 3 \text{ years}$$

9) When the number  $x$  is multiplied by 3 and added to 14, the solution is 32. What is the solution to

$$3(x+4)-12?$$

$$3x+14=32$$

$$\text{so } x=6$$

$$3(x+4)-12 \text{ (substitute } x=6)$$

$$3(6+4)-12=18$$

10)

9. The sum of two numbers,  $m$  and  $p$ , is equal to 72. If  $m$  is the same as  $8 + p$ , then what is the value of  $p$ ?

$$m+p=72$$

$$\text{Substitute } m=p+8 \text{ ... } (p+8)+p=72$$

$$\text{Combine terms: } 2p+8=72$$

$$\text{Solve: } p=32$$

Graph each equation or inequality. (5 points each)

11)  $3(x-1) < 0$

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*First, isolate  $x$ :  $3x-3 < 0$  so  $3x < 3$  so  $x < 1$*

*open dot on 1, shaded to the left.*

12)  $x+4 < 2(x-7)$  or  $x \leq 12$

*closed dot on 12 and open dot on 18 with a line extended to the left of 12 and to the right of 18*

13)  $y=2x+3$

$$y\text{-int} = 3$$

*slope = 2 (up 2, right 1) or (down 2, left 1)*

14)  $y = -\frac{3}{2}x + 5$

$$y\text{-int.} = 5$$

*slope =  $-\frac{3}{2}$  (down three, right 2) or (up three, left 2)*

15)  $4(x-2)+12x-3 \geq 5$

$$\text{Isolate } x: x \leq -2$$

*Closed dot on -2 and line shaded to the left*

Multiple Choice: Choose the correct answer to each problem. (5 points each)

- 16) Any symbol, usually a letter, which could represent a number is a/an...
- a) equation
  - b) variable**
  - c) expression
  - d) symbol
- 17) A mathematical sentence stating that the two expressions have the same value is called a/an
- a) variable
  - b) expression
  - c) inequality
  - d) equation**
- 18) A coordinate where the line of a graph intersects an axis is a/an
- a) intercept**
  - b) y-axis
  - c) point
  - d) slope
- 19) Suppose  $3x+4=16$ . Then what is the solution to  $x(x-1)+15$ ?
- a) 17
  - b) 26
  - c) 27**
  - d) 18
- 20) Which equation is written in slope-intercept form with a y-intercept of 5?
- a)  $y=5x+2$
  - b)  $x=3x+5$
  - c)  $y=14x+5$**
  - d)  $x=5y+15$

Determine whether each statement is true or false. (4 points each)

- 21) Given an equation,  $y=3x+4$ , the y-intercept is equal to the point (0,3).
- a) True
  - b) False**

22) An expression can contain equality and/or inequality signs to represent the relationships between numbers.

a) True

**b) False**

23)  $y=2x+9$  is in slope intercept form with a y-intercept of 9 and a slope of positive 3.

**a) True**

b) False

24)  $2(x+5)-3 = 71$  when  $x=32$

**a) True**

b) False

Answer the following question in complete sentence(s). (4 points)

25) What is one example of either an equation or an inequality that have observed outside of the math classroom? (This example can be from any other area of your life) Please give me an example and then explain how it fits the criteria of either an equation or an inequality.

**Answers will vary.**