Sixth Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Formulas

1. Solve each of the following equations for the stated variable. If you need to divide by a variable you should explicitly state that it is non-zero.
   (a) $F = ma$, for a.
   (b) $ax + b = 0$, for x.
   (c) $2x - 3y = 6$, for y.
   (d) $y = 3x - 5$, for x.
   (e) $Ax + By + C = 0$, for y.
   (f) $y = mx + b$, for m.
   (g) $s = \frac{1}{2}gt^2$, for g.
   (h) $C = \frac{5}{9}(F - 32)$, for F.
   (i) $2y = 3ax - 2x + 3$, for x.
   (j) $2a = \frac{3ax - b}{2b} - c$, for a.
2. Find the numbers described in parts a, d of Exercise 2 of the Fourth set of homework.
3. The width of a rectangle is three less than twice its length.
   (a) If the length of the rectangle is 7 inches how much is its width?
   (b) If the width of the rectangle is 21 inches how much is its length?
   (c) Find a formula that gives the length of the rectangle in terms of its width.
   (d) Write a formula for the perimeter P of this rectangle that involves only its length l.
   (e) If the perimeter of the rectangle is 24 inches find its dimensions (i.e. its length and its width).
4. The temperature C in degrees Celsius and the temperature F in degrees Fahrenheit are related by the formula:
   $$C = \frac{5(F - 32)}{9}$$
   One day the numerical value of both temperature measurements was the same. What was the temperature that day?

2 Interval notation

1. Write each of the sets described by the following mathematical sentences using interval notation, then graph the set in the real line.
   (a) $-3 < x < 5$
   (b) $-3 \leq x < 5$
   (c) $-3 < x \leq 5$

(d) $-3 \leq x \leq 5$

(e) $7 > x > 3$

(f) $-2 \geq x > -5$

(g) $x \geq 5$

(h) $x > -2$

(i) $x < -3$

(j) $x \leq -3$

2. Write each of the sets described by the following English sentences using interval notation, then graph the set in the real line.

   (a) All real numbers that are greater or equal to seven fifths.

   (b) All real numbers that are less than zero.

   (c) The set of real numbers that are larger than three and at the same time smaller than six.

   (d) The set of numbers that are at most 5 and at least -3.

   (e) Those numbers that are at least -8 but no more than -1.

   (f) Those numbers that are no less than $\frac{5}{2}$ and no more than 9.

   (g) Those numbers that are five or less.

   (h) Those numbers that are six or more.

   (i) The numbers strictly between five and seven.

   (j) The numbers strictly between three and two.

   (k) The numbers between negative two and five, inclusive.

3. What intervals are described in the graphs of Figure 1

3 Solving Linear Inequalities

1. Solve each of the following inequalities. Give your answer in interval notation and sketch a graph of the solution.

   (a) $2x - 4 \leq 11$

   (b) $-3x + 2 > 9$

   (c) $5x - 2 < 3x - 8$

   (d) $\frac{3}{2}x - 5 \geq 7x + 2$

   (e) $-3(5x - 1) + 7 > -10x$

   (f) $2(x - 4) + 3x - 4 \leq 5x - 8$

   (g) $-5(x + 3) + 3x - 1 \geq 4(3x + 6) - 2x - 4$

   (h) $3(2x - 2) + 5 > 2(3x + 5) - 11$

2. Solve the inequalities in parts e, f of Exercise 2 of the Fourth set of homework.

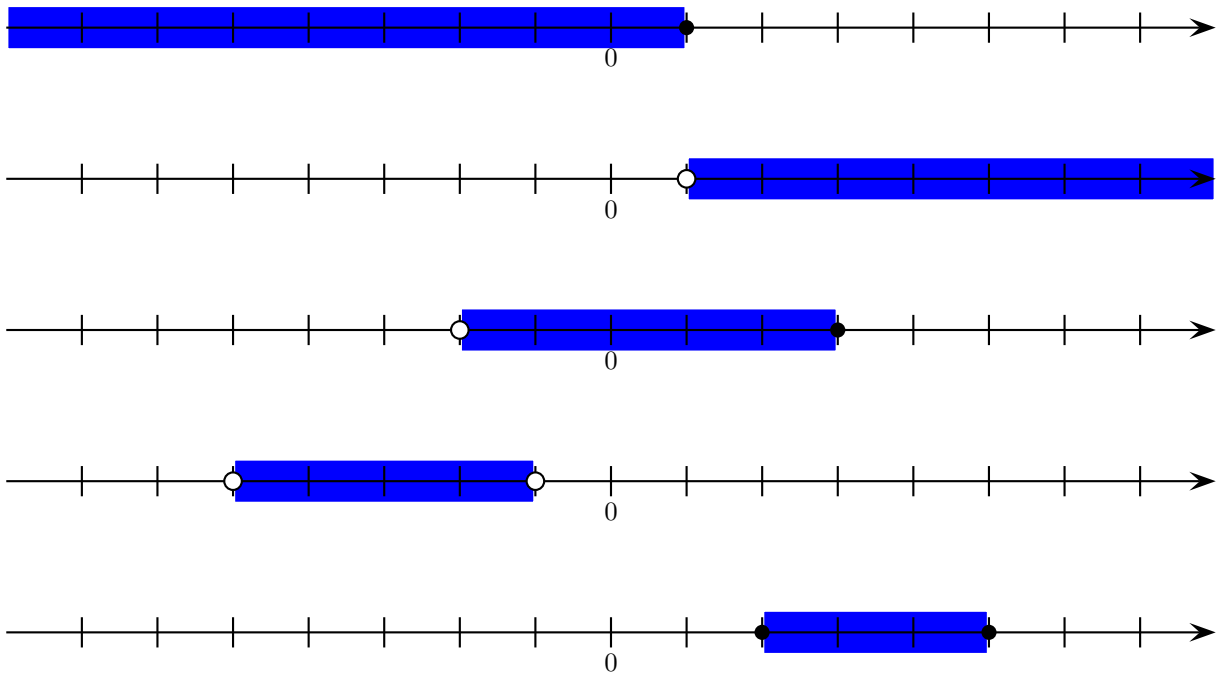

Figure 1: The graphs of Question 3