Completed Exercises from the lecture on

⟨Linear Inequalities in One or Two Variables⟩

1. Hard, Pages 2-7;

Can be found below.

(3) **ee2f611f** [Short answer] [Case-Insensitive]

A local transit company sells a monthly pass for $95 that allows an unlimited number of trips of any length. Tickets for individual trips cost $1.50, $2.50, or $3.50, depending on the length of the trip. What is the minimum number of trips per month for which a monthly pass could cost less than purchasing individual tickets for trips?

$$t = 28$$

minimizing trips ⇒
⇒ maximizing $/trip

$$t \cdot \$3.50 > \$95$$

$$t > \frac{\$95}{\$3.50} \approx 27.24$$

Observation:

$$\$3.5 \times 27 = \$94.5 < \$95$$

$$\$3.5 \times 28 = \$98 > \$95$$

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(4) **1a621af4** $\boxed{\text{SHORT ANSWER}}$ $\boxed{\text{Case-Insensitive}}$

A number x is at most <u>2 less</u> than <u>3 times the value of y.</u> If the value of y is -4, what is the greatest possible value of x?

Tip: Read Right to Left!

$$x \leq 3y - 2$$

$$\boxed{x \leq -14}$$

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(5) **1035faea** [MULTIPLE CHOICE] [One answer only]

A psychologist set up an experiment to study the tendency of a person to select the first item when presented with a series of items. In the experiment, 300 people were presented with a set of five pictures arranged in random order. Each person was asked to choose the most appealing picture. Of the first 150 participants, 36 chose the first picture in the set. Among the remaining 150 participants, p people chose the first picture in the set. If more than 20% of all participants chose the first picture in the set, which of the following inequalities best describes the possible values of p?

    a. $p > 0.20(300 + 36)$, where $p \leq 150$
    b. $p - 36 > 0.20(300)$, where $p \leq 150$
    c. $p + 36 > 0.20(300)$, where $p \leq 150$
    d. $p > 0.20(300 - 36)$, where $p \leq 150$

K=300

Σ

	150	150	300
# Choices₁	36	P	36+P

36+P chose #1
more than 20% chose #1
→ 36+P = more than 20% of all people
= 300

→ 36+P > 20% · 300

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(6) **e8f9e117** SHORT ANSWER   Case-Insensitive

$$I = \frac{V}{R}$$

The formula above is Ohm's law for an electric circuit with current I, in amperes, potential difference V, in volts, and resistance R, in ohms. A circuit has a resistance of 500 ohms, and its potential difference will be generated by n six-volt batteries that produce a total potential difference of $6n$ volts. If the circuit is to have a current of no more than 0.25 ampere, what is the greatest number, n, of six-volt batteries that can be used?

1) $R = 500$

2) $V = 6n$

$\Rightarrow$ 3) $I = \frac{6n}{500}$

4) $I < 0.25$

Using 3) & 4),

$$\frac{6n}{500} < 0.25 \times \frac{500}{6}$$

$\Rightarrow n < 0.25 \times \frac{500}{6} \approx 20.83$

$\Rightarrow n$ is an integer less than 20.83

$\Rightarrow \boxed{n = 20}$

(7) **963da34c** MULTIPLE CHOICE · One answer only

A shipping service restricts the dimensions of the boxes it will ship for a certain type of service. The restriction states that for boxes shaped like rectangular prisms, the (1) sum of the perimeter of the base of the box and the height of the box cannot exceed 130 inches. The perimeter of the base is determined using the width and length of the box. If a box has a (2) height of 60 inches and its (3) length is 2.5 times the width, which inequality shows the allowable width x, in inches, of the box?
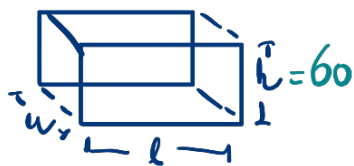
a. $0 \le x \le 10$
b. $0 \le x \le 17\frac{1}{2}$
c. $0 \le x \le 11\frac{2}{3}$
d. $0 \le x \le 20$

(1) $P + h \le 130$

(2) $h = 60$

(3) $\ell = 2.5 \cdot w$

(4) $P = 2(\ell + w) \to$ not given. deduced

$P + h \le 130$ \hfill (1)

$\Leftrightarrow \quad P + 60 \le 130$ \hfill (2)

$\Leftrightarrow \quad 2(\ell + w) + 60 \le 130$ \hfill (4)

$\Leftrightarrow \quad 2(2.5 \cdot w + w) + 60 \le 130$ \hfill (3) $\quad [-60]$

$\Leftrightarrow \quad 2(3.5 w) \le 70$

$\Leftrightarrow \quad 7w \le 70$ \hfill $[\times \frac{1}{7}]$

$\Leftrightarrow \quad w \le 10$

$\Leftrightarrow \quad 0 \le w \le 10$

$\ell = 60$
w
ℓ

25

(9) **830120b0** MULTIPLE CHOICE | One answer only ↗ *trap*

$$y > 2x - 12x > 5$$

Which of the following consists of the $y-$coordinates of all the points that satisfy the system of inequalities above?

a. $y > \frac{3}{2}$
b. $y > \frac{5}{2}$
c. $y > 4$
d. $y > 6$ $\Rightarrow y > 5$

$$y > 2x - 12x > 5$$

Total of marks: 27