Math 2303

Concepts in Algebra

Practice Exam3

Instructions:

1. you will have 1 hour and 15 minutes to complete the exam;
2. books, notes, previous homework are not allowed;
3. you are only allowed to have a pen, a calculator and one sheet of paper on which you can have written whatever you want.

Last Name: SOLUTIONS

First Name:

HW -> 7, 8, 9

1. (25 points) Tanisha Vizquez owns a wallpaper hanging business. Her charge, C, for hanging wallpaper is \$40 plus \$1.60 per square meter of wallpaper she hangs, or

$$C = 40 + 1.60s$$

where s is the number of square meter she hangs.

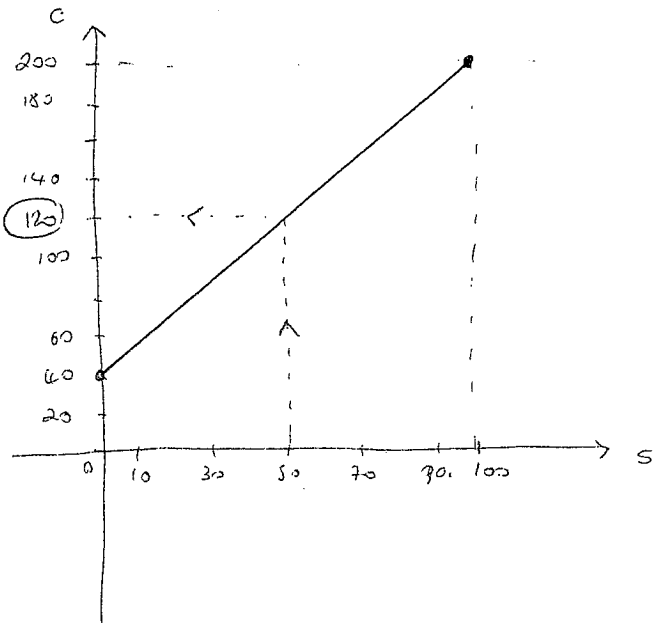
(a) Graph $C = 40 + 1.60s$, for $s \leq 100$

(b) From the graph, estimate her charge if she hangs 50 square meter of wall paper

(c) Use the equation for C to determine how many sqare meter of wallpaper she hung if her charge was \$180.

(a) $0 \leq s \leq 100$ $\quad s = 0 \quad C = 40 \quad (0, 40)$

$s = 100 \quad C = 40 + 160 = 200 \quad (100, 200)$



(b) 120

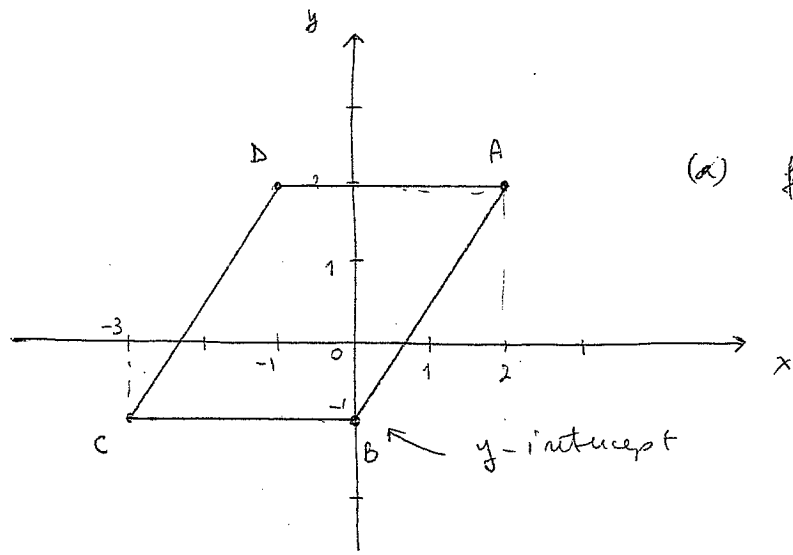
(c) $180 = 40 + 1.60s$

$140 = 1.60s \qquad s = \frac{140}{1.60} = \boxed{87.5}$

2. (25 points) The points A(2,2), B(0,-1) and C(-3,-1) are three vertices of a parallelogram.

(a) Plot the three points in the Cartesian plane and determine the coordinates of the fourth vertex.

(b) Determine the slope of the line passing through A and B. Determine the y-intercept from the graph and finally write the equation of the line.



(a) fourth vertex: $D \equiv (-1, 2)$

(b) $A \equiv (2,2)$
$B \equiv (0,-1)$

$$\text{slope} \equiv \frac{y_A - y_B}{x_A - x_B} = \frac{2-(-1)}{2-0} = \frac{3}{2}$$

y-intercept $\rightarrow$ -1

equation: $\boxed{y = \frac{3}{2}x - 1}$

3. (25 points) For each kilogram of a person's weight, 1.5 mg of the antibiotic drug gentamicin is to be administered. If Giorgio weighs 170 lb, how much of the drug should he receive? (Remember that 1 lb = 0.45 Kg).

convert 170 lb into kg.

$$170\ \cancel{lb}\ \frac{0.45\ kg}{1\ \cancel{lb}} = 170 \times 0.45\ kg = \boxed{76.5\ kg}$$

proportion

$$\frac{1.5\ mg}{1\ kg} = \frac{x\ mg}{76.5\ kg}$$

$$x = 1.5 \cdot 76.5$$

$$x = \boxed{114.75\ mg}$$

4. (25 points) If possible, replace the question mark with the appropriate value:

(a) 20 m^2=? cm^2

m dm cm square units !

2000 00

$\boxed{200000\ cm^2}$

(b) 92 °F = ? °C

$c = \frac{5}{9}(F - 32)$ $c = \frac{5}{9}(92 - 32) = \boxed{33.3\ °C}$

(c) 4.2 l = ? cm^3 not possible in general.

(d) 635 $\frac{km}{sec}$ = ? $\frac{miles}{hour}$

1 mile = 1.6 km.
1 hour = 3600 s.

$635 \frac{km}{sec} \cdot \frac{3600\ sec}{1\ h} \cdot \frac{1\ miles}{1.6\ km} = \frac{635 \cdot 3600}{1.6} \frac{miles}{h} =$

$= \boxed{1,428,750\ \frac{miles}{hour}}$

(e) 25 $\frac{\$}{lb}$ = ? $\frac{euro}{Kg}$ (with 1\$ = 0.91 euros)

1 lb = 0.45 kg

$25 \frac{\$}{lb} \cdot \frac{0.91\ €}{1\ \$} \cdot \frac{1\ lb}{0.45\ kg} = \frac{25 \cdot 0.91}{0.45} \frac{€}{kg} = \boxed{50.5\ \frac{€}{kg}}$

(f) 3.2 cm^2 = ? cm^3

not possible

5. The filter pump on an aquarium circulates 360 ml of water every minute. The aquarium is a rectangular tank whose length, width and height are 0.2 m, 150 mm and 10 cm respectively.

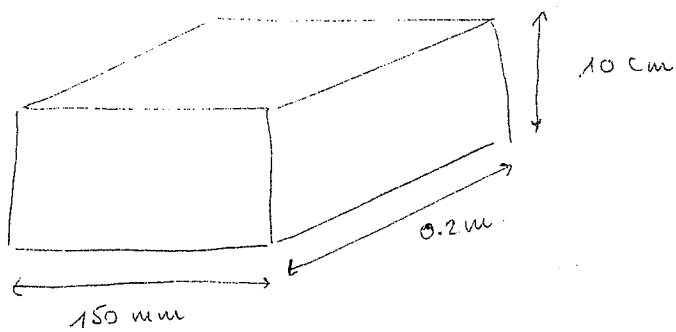
(a) How many ml of water does the aquarium contain?

(b) How long will it take to circulate all the water?

Show your computations.

water

$1\,cm^3$	$1\,ml$	$1\,g$
$1\,dm^3$	$1\,l$	$1\,kg$
$1\,m^3$	$1\,kl$	$1\,ton$



m dm cm mm

(a) convert all in cm.

10 cm

0.2 m = 20 cm

150 mm = 15 cm

$V = (10\,cm) \times (20\,cm) \times (15\,cm) = \boxed{3{,}000\,cm^3} \Rightarrow \boxed{3000\,ml}$

(b) proportion.

$$\frac{360\,ml}{1\,min} = \frac{3000\,ml}{x\,min}$$

$$360 = \frac{3000}{x} \qquad x = \frac{3000}{360} \cong \boxed{8.33\,min}$$