

Instructions: Show all work. Use exact answers unless specifically asked to round. Reduce as much as possible. Be sure to answer all parts of each question.

1. Suppose that you have a 30% sugar solution and a 60% sugar solution, but a recipe that you are making calls for 125 cups of a 48% sugar solution. How much of each solution is required to obtain the desired solution.

$x = \text{Qty of sugar solution } 30\%$
 $y = \text{Qty of sugar solution } 60\%$

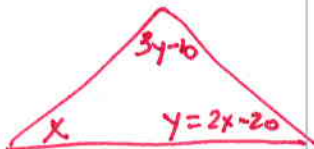
$$\begin{aligned} x + y &= 125 \\ .3x + .6y &= .48(125) = 60 \\ y &= -x + 125 \\ .3x + .6(-x + 125) &= 60 \\ .3x - .6x + 75 &= 60 \\ -.3x &= -15 \end{aligned}$$

$$\begin{cases} x + y = 125 \\ .3x + .6y = 60 \end{cases}$$

$$\begin{aligned} x &= 50 \\ y &= -50 + 125 = 75 \end{aligned}$$

You need 50 cups of the 30% solution & 75 cups of the 60% solution

2. Suppose that you have a triangle where the second largest angle is twenty degrees less than twice the smallest angle. The largest angle is ten degrees less than three times the second largest angle. Find the three angles.



$$\begin{aligned} x + 3y - 10 + y &= 180 \\ x + 4y - 10 &= 180 \\ x + 4(2x - 20) - 10 &= 180 \\ x + 8x - 80 - 10 &= 180 \\ 9x - 90 &= 180 \\ 9x &= 270 \\ x &= 30 \end{aligned}$$

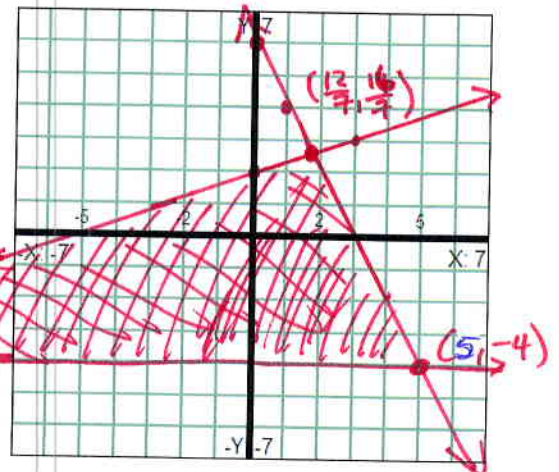
$$\begin{aligned} y &= 2x - 20 \\ y &= 2(30) - 20 = 60 - 20 = 40 \\ 3(40) - 10 &= 110 \end{aligned}$$

Smallest = 30°
 Second largest = 40°
 Largest = 110°

3. Graph the system of linear inequalities $\begin{cases} y \leq -2x + 6 \\ y \leq \frac{1}{3}x + 2 \\ y \geq -4 \end{cases}$ on

the graph to the right. Shade the region that satisfied the system. Label all points of intersection of the graphs.

$$\begin{aligned} y=4 &\Rightarrow -4 = \frac{1}{3}x + 2 \Rightarrow -6 = \frac{1}{3}x \Rightarrow x = -18 \\ y=4 &\Rightarrow -4 = -2x + 6 \Rightarrow -10 = -2x \Rightarrow x = 5 \\ (-2x + 6 = \frac{1}{3}x + 2) \cdot 3 &= -6x + 18 = x + 6 \\ -7x &= -12 \\ y &= \frac{1}{3}(\frac{12}{7}) + 2 = \frac{4}{7} + \frac{14}{7} = \frac{18}{7} \end{aligned}$$



intersections $(\frac{12}{7}, \frac{18}{7})$
 $(5, -4)$
 $(-18, -4)$

4. Simplify the expressions and combine like terms.

a. $(2x^2 + 7x - 11) - (x^2 - 2x - 16)$

$$2x^2 + 7x - 11 - x^2 + 2x + 16$$
$$x^2 + 9x + 5$$

b. $\left(\frac{-2a^2b}{3ab^3}\right)^2 = \frac{4a^4b^2}{9a^2b^6} = \frac{4a^2}{9b^4}$

c. $4k^2(2k^2 - 3k + 4) = 8k^4 - 12k^3 + 16k^2$

5. State the degree of the polynomial. Also state whether the polynomial is a monomial, a binomial or a trinomial, or none of these.

a. $2x^2 - x^3 + 11$

3rd degree, trinomial

b. $x^4y^2 + 16$

6th degree, binomial

c. 9

0th degree, monomial

d. $4x^2 + q^5 + 22xq - 19$

5th degree, none of these

6. Give two examples of expression that are NOT polynomials.

$$\sqrt{x}, \frac{1}{x}, x^{-3}, x^{\sqrt{3}}, 2^x$$

answers will vary