

EXAM 1/CHAPTER 2.3-3.5

90 POINTS POSSIBLE

NAME Key

COEFFICIENTS SHOULD BE INTEGERS OR SIMPLIFIED IMPROPER FRACTIONS
 SHOW ALL WORK IN ORDER TO EARN FULL CREDIT
 NO DECIMALS UNLESS INDICATED IN THE PROBLEM
 BOX YOUR FINAL ANSWER

1. (24 POINTS) Each part is worth 6 points. Solve the equation. Use set notation to identify solutions.

a. $3(x+2)+12=-5$

$$3x+6+12=-5$$

$$3x+18 = -5$$

$$\underline{-18} \quad \underline{-18}$$

$$\frac{3x}{3} = \frac{-23}{3}$$

$$x = -\frac{23}{3}$$

$$\boxed{\left\{-\frac{23}{3}\right\}}$$

b. $9x+2=16$

$$\underline{-2} \quad \underline{-2}$$

$$\frac{9x}{9} = \frac{14}{9}$$

$$x = \frac{14}{9}$$

$$\boxed{\left\{\frac{14}{9}\right\}}$$

c. $2x-1=5(x-4)+8$

$$2x-1=5x-20+8$$

$$2x-1=5x-12$$

$$\underline{-5x+11} \quad \underline{-5x+11}$$

$$\frac{-3x}{-3} = \frac{-11}{-3}$$

$$x = +\frac{11}{3}$$

$$\boxed{\left\{\frac{11}{3}\right\}}$$

d. $6-(x+5)+1=1-x$

$$6-x-5+1=1-x$$

$$6-x-4 = 1-x$$

$$2-x = 1-x$$

$$\underline{-2+x} \quad \underline{-2+x}$$

$$0+x = -1+x$$

$$0 = -1 \text{ FALSE!}$$

$$\boxed{\{ \}}$$

2. (8 POINTS) A car rental agency charges \$200 per week plus \$0.25 per mile. How many miles can you travel in one week for \$550? Show all steps—no trial and error. You must show the mathematical model, and all steps of the solution. If needed, you may round to the nearest dollar.

① Analysis

Let x be the # of miles traveled in one week

② Translate

$$200 + 0.25x = 550$$

③ Solve

$$\begin{array}{r} 200 + 0.25x = 550 \\ -200 \quad -200 \\ \hline 0.25x = 350 \\ \frac{.25}{.25} \quad \frac{.25}{.25} \end{array}$$

$$x = 1400$$

④ Conclusion

You can travel 1,400 miles in one week for \$550.

3. (8 POINTS) One angle of a triangle is twice as large as another. The measure of the third angle is 40° more than that of the smallest angle. Find the measure of each angle. Show all steps—no trial and error. You must show the mathematical model, and all steps of the solution. If necessary, you may round to the nearest tenth of a degree.

① Analysis

Let x be the measure of the smallest angle.

② Translate

$$\underbrace{(x)}_{\text{1st angle}} + \underbrace{(2x)}_{\text{2nd angle}} + \underbrace{(x+40)}_{\text{3rd angle}} = 180$$

③ Solve

$$x + 2x + x + 40 = 180$$

$$4x + 40 = 180$$

$$\begin{array}{r} 4x + 40 = 180 \\ -40 \quad -40 \\ \hline 4x = 140 \\ \frac{4x}{4} = \frac{140}{4} \end{array}$$

$$x = 35$$

So $2x = 2(35) = 70$

and $x + 40 = 35 + 40 = 75$

④ Conclusion

The angles measure 35° , 70° , and 75° .

4. (2 POINTS) Solve the formula $d = rt$ for t .

$$\frac{d}{r} = \frac{rt}{r}$$

$$\frac{d}{r} = t$$

$$t = \frac{d}{r}$$

5. (5 POINTS) A pair of boots is on sale for 30% off the original price. The sale price is \$108. What was the original price? You may round to the nearest dollar, if necessary.

① Analysis

Let x be the original price

② Translate

30% off means you pay 70% of orig.

$$70\% \cdot x = 108$$

③ Solve

$$\frac{0.70x = 108}{\cdot 70 \quad \cdot 70}$$

$$x \approx 154$$

④ Conclusion

The original price was approx. \$154.

6. (6 POINTS) Solve the inequality, represent the set of solutions in interval and set-builder notation, and graph the solution set.

$$-3(x-8) - 12 \geq -x + 4$$

$$-3x + 24 - 12 \geq -x + 4$$

$$-3x + 12 \geq -x + 4$$

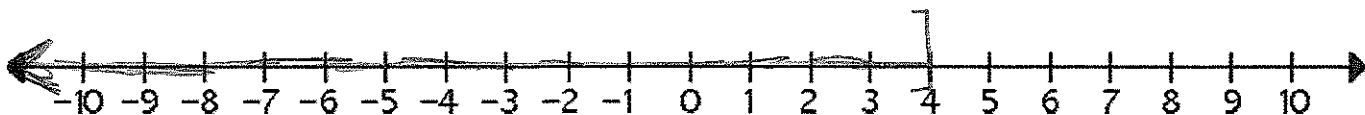
$$\frac{+x - 12}{-2x} \geq \frac{+x - 4}{-2}$$

$$\frac{-2x}{-2} \geq \frac{-8}{-2}$$

$$x \leq 4$$

Interval notation: $(-\infty, 4]$

Set-builder notation: $\{x \mid x \leq 4\}$



7. (10 POINTS) Graph the equation $2x - 5y = 10$ using the method of your choice. **LABEL AXES AND WRITE IN THE SCALE!**

$$2x - 5y = 10$$

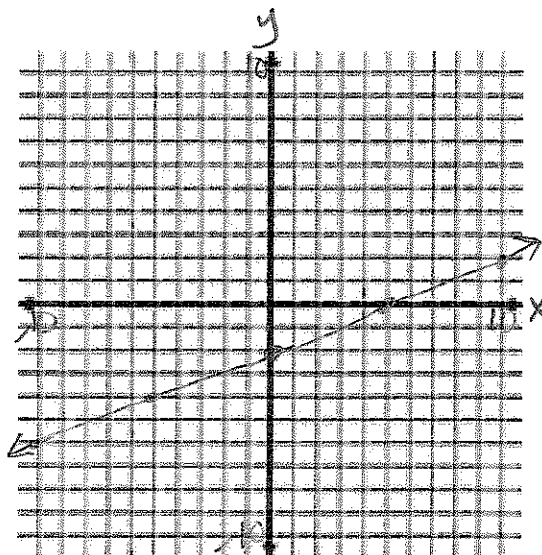
$$\frac{-2x}{-5} = \frac{-2x + 10}{-5}$$

$$\frac{-5x}{-5} = \frac{-2x + 10}{-5}$$

$$x = \frac{2}{5}x - 2$$

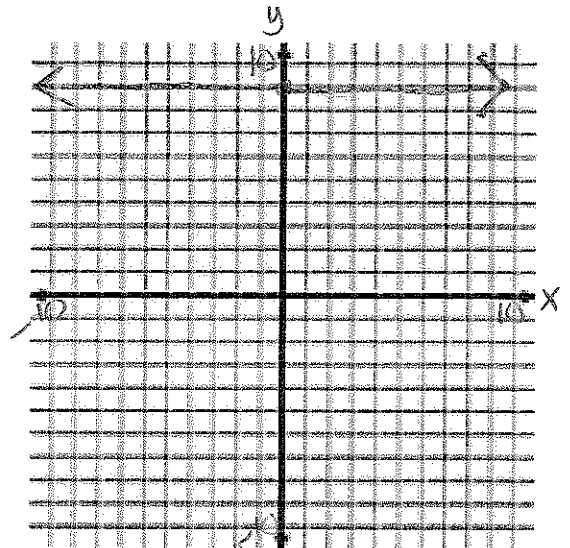
$$m = \frac{2}{5}$$

$$y\text{-int: } (0, -2)$$



8. (10 POINTS) Graph $2y = 18$ using any method. LABEL AXES AND WRITE IN THE SCALE!

$$\begin{aligned} 2y &= 18 \\ \frac{2y}{2} &= \frac{18}{2} \\ y &= 9 \end{aligned}$$



9. (8 POINTS) Write an equation for the line which passes through the points $(1, -3)$ and $(-5, -2)$.

① Find slope $m = \frac{-3 - (-2)}{1 - (-5)} = \frac{-3 + 2}{1 + 5} = \frac{-1}{6}$

② use point-slope form $y - y_1 = m(x - x_1)$
 $y - (-3) = -\frac{1}{6}(x - 1)$
 $y + 3 = -\frac{1}{6}(x - 1)$

③ Find slope-int. form $y + 3 = -\frac{1}{6}(x - 1)$
 $y + 3 = -\frac{1}{6}x + \frac{1}{6}$
 $\quad \quad \quad -3 \quad \quad \quad -3 \frac{1}{6}$
 $y = -\frac{1}{6}x + \frac{1}{6} - \frac{18}{6}$
 $y = -\frac{1}{6}x - \frac{17}{6}$

Point-slope form: $y + 3 = -\frac{1}{6}(x - 1)$

Slope-intercept form: $y = -\frac{1}{6}x - \frac{17}{6}$

10. (9 POINTS) Consider the line $7x - 8y = 5$.

$$\begin{array}{r} 7x - 8y = 5 \\ -7x \quad \quad -7x \\ \hline -8y = -7x + 5 \\ \quad \quad \quad -8 \quad \quad \quad -8 \\ \hline \quad \quad \quad y = \frac{7}{8}x - \frac{5}{8} \end{array}$$

- a. The slope of this line is $\frac{7}{8}$.
- b. The slope of any line which is parallel to $7x - 8y = 5$ is $\frac{7}{8}$.
- c. The slope of any line which is perpendicular to $7x - 8y = 5$ is $-\frac{8}{7}$.

$$\begin{aligned} m \cdot \frac{7}{8} &= -1 \\ m &= -\frac{8}{7} \end{aligned}$$