Graphing Linear Relationships with Two Variables – $Ax + By = C$

Instructions for each problem:

a) Define your variables. Identify what x and y represent.
b) Build an equation representing the situation. Express it in the form Ax + By = C.
c) Find the x-intercept algebraically by substituting y = 0.
d) Find the y-intercept algebraically by substituting x = 0.
e) Sketch the linear function using the two intercepts. Clearly identify the intercepts
f) Label both axes.

Mild

1. Kendra sells apples for $3 per kilogram and pears for $4 per kilogram at the town market. One customer spends exactly $36 purchasing a combination of apples and pears.

2. A Grade 9 class is organizing a spaghetti dinner to raise money for a field trip. Adult tickets cost $12 and child tickets cost $8. The class collects exactly $96 from ticket sales.

3. At a school concession stand, popcorn costs $5 per bag and juice costs $2 per bottle. The stand collects exactly $40 from one group of customers.

Medium

4. Maya has a jar containing only nickels worth $0.05 each and dimes worth $0.10 each. The combined value of the coins is exactly $3.00.

5. Organizers of a summer festival sell general admission passes for $80 each and VIP passes for $120 each. Their ticket sales generate exactly $9,600 in revenue.

6. A grocery store pays part-time workers $18 per hour and full-time workers $25 per hour. The store has budgeted exactly $900 for the combined wages of these employees.

Spicy

7. Two friends take a road trip that includes highway driving and mountain roads. Their vehicle uses fuel costing an average of $0.12 per kilometer on the highway and $0.18 per kilometer on mountain roads. The total fuel cost for the trip is $36.

8. Lena earns $18 per hour working at a grocery store and $25 for each lawn she mows. During one week, her combined earnings from these two jobs are exactly $450.

9. A courier company calculates its delivery charges using two rates: $6 per kilogram of parcel weight and $0.50 per kilometre of delivery distance. One delivery has a total charge of $60.

Extra Spicy

10. Ms. Harris orders notebooks for $2 each and pencils for $0.50 each. The supplier also charges a flat $15 delivery fee, regardless of the number of items ordered. Her total bill, including delivery, is exactly $35.

11. A printing company charges $0.12 per black-and-white page and $0.35 per colour page. Every order also includes a $5 service fee. The student council submits a printing order with a final bill of exactly $47.

12. A print shop charges $7.50 for each custom T-shirt and $12.50 for each custom hoodie. The shop also charges a one-time $25 artwork setup fee. A school club places an order with a total bill of exactly $175.