

Chapter 6 — Graphing Linear Equations and Slope

Teacher Guide

Teacher Chapter-at-a-Glance

Materials

Student text, worksheets, graph paper or coordinate-plane templates, ruler, coloured pencils, optional transparent grid overlay.

Pacing

Teach slope and y-intercept before graphing from slope-intercept form. Teach slope from two points before horizontal and vertical special cases. Introduce parallel and perpendicular relationships only after students can identify slope reliably.

Talk Prompt

“What changes on a graph, and what stays the same, when a line has a positive, negative, zero, or undefined slope?”

If Ready-to-Learn Reveals a Gap

If students reverse coordinate order or struggle with evaluation, revisit Chapter 2. If students cannot interpret fractions as ratios, use rise/run models with integer movements before formal slope fractions.

Mastery Decision Guide

What a missed Tripwire item actually means, and what to do about it before moving on.

Missed Tripwire #1 → Calling a vertical line slope 0 (Mistake 3). *Student labels a vertical line as slope 0.* Review before the next chapter.

Missed Tripwire #2 → Mixing up slope and the y-intercept (Mistake 1). *Student labels the constant as slope and the coefficient of x as intercept.* Review before the next chapter.

Ready-to-Learn Check

Quick check before starting. A wrong answer below points to a specific gap worth closing first, not just a miss to shrug off.

1. Plotting an ordered pair. Which point is 3 units right and 2 units up from the origin?

Correct answer: (3,2)

Likely wrong answer: (2,3)

Misconception: The student may reverse coordinate order.

Next move: Review that ordered pairs are written (x,y): horizontal movement first, vertical movement second.

2. Evaluating a linear expression. Find y when $y=2x+1$ and $x=3$.

Correct answer: $y=7$, so the point is (3,7)

Likely wrong answer: $y=9$

Misconception: The student may add before multiplying.

Next move: Review Chapter 2: substitute first, multiply next, then add.

3. Simplifying a ratio. Simplify $6/3$.

Correct answer: 2

Likely wrong answer: $3/6$

Misconception: The student may flip rather than simplify the ratio.

Next move: Review that rise/run can be simplified by dividing numerator and denominator by the same factor.

4. Identify a starting value. A savings account begins with \$50 and increases by \$10 each week. What is the starting value?

Correct answer: 50

Likely wrong answer: 10

Misconception: The student may confuse a starting amount with the amount of change.

Next move: Review the amount present at the beginning versus the amount added for each unit of time.

Common Mistakes

Students often run into the same kinds of trouble with this topic. Recognizing these patterns helps avoid them.

Mistake 1: Mixing up slope and the y-intercept

What students do: For $y=3x-2$, the student says $m=-2$, $b=3$

Why this happens: The student reads left to right without connecting to $y=mx+b$.

What to do instead: The coefficient of x is $m=3$. The constant is $b=-2$.

Diagnostic trigger: Student labels the constant as slope and the coefficient of x as intercept.

Mistake 2: Setting up the slope relationship incorrectly

What students do: For points $(1,2)$ and $(5,10)$, the student uses run/rise or writes $m=(10-2)/(1-5)$

Why this happens: The student may remember two changes but not track which belongs on top, or may not keep point order consistent.

What to do instead: Slope is rise/run. Use the same point order in both differences:
 $m=(10-2)/(5-1)=2$.

Diagnostic trigger: Student reports a reciprocal or opposite-sign slope caused by reversed rise/run or mismatched coordinate order.

Mistake 3: Calling a vertical line slope 0

What students do: The student says a vertical line has slope 0 because it does not move left or right.

Why this happens: The student confuses no run with no rise.

What to do instead: A horizontal line has rise 0, so slope is 0. A vertical line has run 0, so slope is undefined.

Diagnostic trigger: Student labels a vertical line as slope 0.

Mistake 4: Ignoring the negative sign in a slope

What students do: The student reads $m=-2/3$ as up 2 and right 3.

Why this happens: The student sees numerator and denominator but does not connect the negative sign to direction.

What to do instead: A negative slope can be shown by moving down 2 and right 3, or up 2 and left 3.

Diagnostic trigger: Student graphs a negative slope as a rising line.

Practice

TEACHING NOTE

Practice items are grouped by skill (A-C) so a teacher can assign a subset for targeted review rather than the full set.

Teacher solutions follow this practice set.

1. A. Slope and Intercept

2. Identify m and b : $y=4x-3$ (Hint: compare with $y=mx+b$.)
3. Identify m and b : $y=-x+5$ (Hint: read $-x$ as $-1x$.)
4. Identify the slope and y -intercept: $y=1/2x-4$ (Hint: the coefficient of x is the slope.)
5. Describe the line: $y=6$ (Hint: does the equation have an x -term?)
6. Describe the line: $x=-2$ (Hint: does every point have the same x -value or same y -value?)

7. B. Slope from Two Points

8. Find the slope through $(0,3)$ and $(2,7)$ (Hint: use rise over run.)
9. Find the slope through $(-1,5)$ and $(3,-3)$ (Hint: keep coordinate order consistent.)
10. Find the slope through $(4,2)$ and $(4,-5)$ (Hint: what happens to the run?)

11. C. Applications and Special Lines

12. A taxi charges a \$5 starting fee and \$3 per kilometre. Write an equation for cost C after k kilometres. Identify slope and y -intercept. (Hint: the starting fee is the y -intercept.)
13. A ramp rises 1.2 m over a horizontal run of 6 m. Find the slope. Is it gentler or steeper than $1/2$? (Hint: write slope as rise over run.)
14. Are $y=-3x+1$ and $y=-3x-8$ parallel? Explain. (Hint: compare slopes.)
15. Is $(3,7)$ on $y=2x+1$? Show the check. (Hint: substitute $x=3$.)

Practice Solutions

Use these concise solutions to check the method as well as the final answer.

2. Identify m and b : $y=4x-3$ (Hint: compare with $y=mx+b$.)

Solution: Compare $y = 4x - 3$ with $y = mx + b$: $m = 4$ and $b = -3$.

3. Identify m and b : $y=-x+5$ (Hint: read $-x$ as $-1x$.)

Solution: Read $-x$ as $-1x$: $m = -1$ and $b = 5$.

4. Identify the slope and y -intercept: $y=1/2x-4$ (Hint: the coefficient of x is the slope.)

Solution: The coefficient of x is the slope: $m = 1/2$ and $b = -4$.

5. Describe the line: $y=6$ (Hint: does the equation have an x -term?)

Solution: $y = 6$ is horizontal, so its slope is 0 and its y -intercept is 6.

6. Describe the line: $x=-2$ (Hint: does every point have the same x -value or same y -value?)

Solution: $x = -2$ is vertical, so every point has x -coordinate -2 and the slope is undefined.

8. Find the slope through $(0,3)$ and $(2,7)$ (Hint: use rise over run.)

Solution: $m = (7 - 3)/(2 - 0) = 4/2 = 2$.

9. Find the slope through $(-1,5)$ and $(3,-3)$ (Hint: keep coordinate order consistent.)

Solution: $m = (-3 - 5)/(3 - (-1)) = -8/4 = -2$.

10. Find the slope through $(4,2)$ and $(4,-5)$ (Hint: what happens to the run?)

Solution: $m = (-5 - 2)/(4 - 4) = -7/0$, so the slope is undefined.

12. A taxi charges a \$5 starting fee and \$3 per kilometre. Write an equation for cost C after k kilometres. Identify slope and y -intercept. (Hint: the starting fee is the y -intercept.)

Solution: The starting fee is 5 and the rate is 3: $C = 3k + 5$; slope 3, y -intercept 5.

13. A ramp rises 1.2 m over a horizontal run of 6 m. Find the slope. Is it gentler or steeper than $1/2$? (Hint: write slope as rise over run.)

Solution: $m = 1.2/6 = 0.2 = 1/5$. Since $1/5 < 1/2$, the ramp is gentler.

14. Are $y=-3x+1$ and $y=-3x-8$ parallel? Explain. (Hint: compare slopes.)

Solution: Both equations have slope -3 , so the lines are parallel.

15. Is $(3,7)$ on $y=2x+1$? Show the check. (Hint: substitute $x=3$.)

Solution: Substitute $x = 3$: $2(3) + 1 = 7$. Yes, $(3, 7)$ is on the line.

Tripwire Check

These questions test whether the thinking is solid — not just whether the procedure was memorized. Each wrong answer below points to a specific misconception, not just "try again."

1. Horizontal or Vertical? Line A passes through (2,5) and (6,5). Line B passes through (3,1) and (3,8). A student says both lines have slope 0 because neither line is slanted. Is the student correct? Find both slopes and describe each line.

Correct answer: Line A has slope 0 and is horizontal. Line B has undefined slope and is vertical.

Likely wrong answer: Both slopes are 0.

Misconception: The student may confuse no rise with no run and may not understand division by 0.

Next move: Compare $0/4$ with $7/0$.

2. Slope or Intercept? A student reads $y = -2x + 6$ and says the slope is 6 because 6 is where the line starts. Is the student correct? Identify the slope and y-intercept, then give two points on the line.

Correct answer: $m = -2$ and $b = 6$. Example points: (0,6), (1,4), (2,2).

Likely wrong answer: $m = 6$, $b = -2$.

Misconception: The student may recognize a starting value but may not connect equation parts correctly to $y = mx + b$.

Next move: Write the equation below $y = mx + b$ and label coefficient and constant separately.

Answer Key — Worksheets (Full Diagnostic)

Worksheet A: Guided Practice

1. What is the slope of a horizontal line? Give an example equation.

1. Slope 0; example $y = 3$ Likely wrong answer: undefined, or slope 1 (confuses horizontal with vertical). Misconception: Horizontal and vertical lines are mixed up when naming which one has zero slope.

2. Graph: $y = x + 2$

2. Example points: (0,2), (1,3), (2,4) Likely wrong answer: plots points but starts at the wrong y-intercept, e.g. (0,0). Misconception: The y-intercept is read as 0 instead of the constant term in the equation.

3. Find the slope through: (0,0) and (3,6)

3. $m=2$ Likely wrong answer: $m=1/2$ (reverses rise and run). Misconception: The change in y and the change in x are divided in the wrong order.

4. Plot (3,-5). Draw a line through it with slope 2. Name one more point.

4. Example point (4,-3) Likely wrong answer: moves right 2, up 1 instead of up 2, right 1. Misconception: Rise and run are swapped when plotting a slope from a point.

5. Identify m and b: $y=3x-2$

5. $m=3$, $b=-2$ Likely wrong answer: $m=-2$ (reads the sign of b as part of m, or misses the negative on b). Misconception: The constant's own sign is dropped when it is read out of the equation.

6. Graph: $y=-2x+3$

6. Example points: (0,3), (1,1), (2,-1) Likely wrong answer: plots with slope going up instead of down. Misconception: A negative slope is graphed as if it were positive, rising instead of falling.

7. Find the slope through: (2,5) and (6,1)

7. $m=-1$ Likely wrong answer: $m=1$ (subtracts the coordinates in mismatched order between numerator and denominator). Misconception: The two points' coordinates are subtracted in inconsistent order between rise and run.

8. A line rises 6 units over a run of 3 units. What is the slope?

8. $m=2$ Likely wrong answer: $m=1/2$ (reverses rise and run). Misconception: The change in y and the change in x are divided in the wrong order.

9. Identify m and b: $y=-x+4$

9. $m=-1$, $b=4$ Likely wrong answer: $m=0$ (misses that -x means -1x). Misconception: A bare negative variable is read as having no coefficient instead of coefficient -1.

10. Graph: $x=2$

10. Vertical; undefined slope Likely wrong answer: slope 0 (confuses vertical with horizontal). Misconception: Horizontal and vertical lines are mixed up when naming which one has undefined slope.

11. A ramp rises 2.4 m over a 6 m horizontal run. Find the slope.

11. $m=0.4=2/5$ Likely wrong answer: $m=6/2.4$ (reverses rise and run). Misconception: The change in height and the change in horizontal distance are divided in the wrong order.

12. A line passes through (0,-4) and has slope 3. Name two more points.

12. Example points (1,-1), (2,2) Likely wrong answer: moves right 3, up 1 instead of up 3, right 1. Misconception: Rise and run are swapped when plotting a slope from a point.

13. Are these lines parallel? $y=2x+5$ and $y=2x-3$ Explain.

13. Yes; both slopes 2 Likely wrong answer: No, because the y-intercepts differ. Misconception: The y-intercept is compared instead of the slope when checking for parallel lines.

14. Find the slope of a line perpendicular to $m=3$.

14. $-1/3$ Likely wrong answer: 3 (uses the reciprocal without negating it). Misconception: Only the reciprocal is taken; the sign is not flipped for a perpendicular slope.

15. Is (4,9) on $y=2x+1$? Show the check.

15. Yes. $2(4)+1=9$. Likely wrong answer: No (substitutes y instead of x, or miscalculates). Misconception: The wrong coordinate is substituted into the equation during the check.

Worksheet B: Independent Practice

1. A line has slope $3/4$ and passes through (0,2). Name two more points on the line.

1. Example points: (4,5), (8,8) Likely wrong answer: (1,2.75), (2,3.5) (adds the slope's numerator and denominator separately instead of scaling by the whole fraction). Misconception: A fractional slope is applied one number at a time instead of as a single rate.

2. Graph: $y=2x-4$

2. Example points: (0,-4), (1,-2), (2,0) Likely wrong answer: starts the graph at (0,2) instead of (0,-4). Misconception: The y-intercept is misread from the equation's constant term.

3. Find the slope through: (1,2) and (5,10)

3. $m=2$ Likely wrong answer: $m=1/2$ (reverses rise and run). Misconception: The change in y and the change in x are divided in the wrong order.

4. A phone plan costs \$30 per month plus \$5 per GB. Write C in terms of g. Identify slope and intercept.

4. $C=5g+30$; $m=5$, $b=30$ Likely wrong answer: $C=30g+5$ (swaps the flat fee and the per-GB rate). Misconception: The flat monthly fee and the per-unit rate are assigned to the wrong roles.

5. Graph: $y=-x+3$

5. Example points: (0,3), (1,2), (2,1) Likely wrong answer: plots with slope going up instead of down. Misconception: A negative slope is graphed as if it were positive, rising instead of falling.

6. Find the slope through: (-2,4) and (2,-4)

6. $m=-2$ Likely wrong answer: $m=2$ (drops the negative sign when both changes are negative). Misconception: The sign of the rise is lost when both coordinates decrease.

7. Identify slope and y-intercept: $y=-4x+9$

7. $m=-4$, $b=9$ Likely wrong answer: $m=9$, $b=-4$ (swaps slope and intercept). Misconception: The coefficient of x and the constant term are assigned to the wrong roles.

8. A worker earns \$18 per hour and starts with \$0. Write P in terms of h. Give three graph points.

8. $P=18h$; example points (0,0), (1,18), (2,36) Likely wrong answer: $P=18h+18$ (adds a starting amount that was never given). Misconception: A fixed starting value is assumed even though the problem states starting at \$0.

9. Graph: $y=1/2x+1$

9. Example points: (0,1), (2,2), (4,3) Likely wrong answer: plots using slope 2 instead of 1/2. Misconception: A fractional slope's denominator is dropped, leaving only the numerator as the rise.

10. Find the slope through: (3,7) and (3,-1)

10. Undefined Likely wrong answer: $m=0$ (confuses vertical with horizontal). Misconception: Horizontal and vertical lines are mixed up when the run is 0.

11. Identify slope and y-intercept: $y=-7$

11. $m=0$, $b=-7$ Likely wrong answer: $m=-7$, $b=0$ (treats the equation as if x were present with coefficient -7). Misconception: A horizontal line's equation is misread as if it had a nonzero slope.

12. A taxi charges \$4 to start and \$2.50 per kilometre. Write an equation and explain slope and intercept.

12. $C=2.50k+4$; slope is rate, intercept is starting fee Likely wrong answer: $C=4k+2.50$ (swaps the flat fee and the per-kilometre rate). Misconception: The flat starting fee and the per-unit rate are assigned to the wrong roles.

13. Are $y=4x+7$ and $y=4x-2$ parallel? Explain.

13. Parallel Likely wrong answer: No, because the constants differ. Misconception: The y -intercept is compared instead of the slope when checking for parallel lines.

14. Graph: $y=-3/2x+2$

14. Example points: $(0,2)$, $(2,-1)$, $(4,-4)$ Likely wrong answer: plots with slope going up instead of down. Misconception: A negative slope is graphed as if it were positive, rising instead of falling.

15. Find the slope through: $(-5,6)$ and $(4,6)$

15. $m=0$ Likely wrong answer: $m=1$ (subtracts the coordinates in mismatched order). Misconception: The two points' coordinates are subtracted in inconsistent order between rise and run.

16. Describe the graph: $x=5$

16. Vertical; undefined slope Likely wrong answer: slope 0 (confuses vertical with horizontal). Misconception: Horizontal and vertical lines are mixed up when naming which one has undefined slope.

17. A line passes through $(0,6)$ and $(2,0)$. Find slope and y -intercept.

17. $m=-3$; y -intercept 6 Likely wrong answer: $m=3$ (drops the negative sign on the rise). Misconception: The direction of decrease from one point to the next is not carried into the sign of the slope.

18. Explain why a vertical line has undefined slope.

18. Run is 0, so slope is undefined Likely wrong answer: says the run is undefined instead of the slope. Misconception: Undefined division is attributed to the wrong quantity in the slope formula.

19. Find the slope perpendicular to $m=-2$.

19. $1/2$ Likely wrong answer: -2 (uses the reciprocal without negating it). Misconception: Only the reciprocal is taken; the sign is not flipped for a perpendicular slope.

20. Is $(4,-1)$ on $y=-2x+7$? Show the check.

20. Yes Likely wrong answer: No (substitutes y instead of x , or miscalculates). Misconception: The wrong coordinate is substituted into the equation during the check.

Worksheet C: Mixed Application

1. A phone plan costs \$30 per month plus \$5 per GB. Write C in terms of g . Find the cost for 12 GB. Then find g if the bill is \$75.

1. $C=5g+30$; \$90 for 12 GB; 9 GB for \$75 Likely wrong answer: $C=30g+5$ (swaps the flat fee and the per-GB rate). Misconception: The flat monthly fee and the per-unit rate are assigned to the wrong roles.

2. A line passes through $(0,4)$ and has slope $-1/2$. Write the equation. Then give two more points that lie on the line.

2. $y=-1/2x+4$; example points $(2,3)$, $(4,2)$ Likely wrong answer: $y=2x+4$ (drops the negative sign and the fraction, using the whole-number reciprocal instead). Misconception: A fractional negative slope is replaced with a whole number, losing both its size and sign.

3. A plant is 3 cm tall and grows 2 cm per day. Write H in terms of d . Find height after 10 days.

3. $H=2d+3$; 23 cm after 10 days Likely wrong answer: $H=3d+2$ (swaps the starting height and the daily growth rate). Misconception: The starting value and the rate of change are assigned to the wrong roles.

4. Are $y=2x+1$ and $y=-1/2x+5$ parallel, perpendicular, or neither? Explain.

4. Perpendicular Likely wrong answer: says parallel because 'both have x in them'. Misconception: Any two linear equations are assumed related without actually comparing the slopes.

5. A worker starts with \$200 saved and saves \$80 per week. Write S in terms of w . Find weeks to reach \$1,000.

5. $S=80w+200$; 10 weeks Likely wrong answer: $S=200w+80$ (swaps the starting amount and the weekly rate). Misconception: The starting value and the rate of change are assigned to the wrong roles.

6. Find the slope between $(-3,8)$ and $(6,-1)$. Then describe whether the line rises or falls from left to right.

6. $m=-1$; falls from left to right Likely wrong answer: $m=1$ (drops the negative sign on the rise). Misconception: The direction of decrease between the two points is not carried into the sign of the slope.

7. Write an equation for a line parallel to $y=-3x+2$ that passes through the y-axis at 4.

7. $y=-3x+4$ Likely wrong answer: $y=-3x-4$ (uses the negative of the given y-intercept instead of the new one). Misconception: The new y-intercept given in the problem is replaced with an unrelated value from the original equation.

8. Write the equation of the vertical line through $(3,4)$. Explain why it cannot be written as $y=mx+b$.

8. $x=3$; a vertical line has undefined slope Likely wrong answer: $y=3$ (writes a horizontal line instead of a vertical one). Misconception: Vertical and horizontal lines are mixed up when translating a point into a line's equation.

9. A delivery service charges \$12 plus \$0.75 per kilometre. Write C in terms of k . Find cost for 20 km.

9. $C=0.75k+12$; \$27 for 20 km Likely wrong answer: $C=12k+0.75$ (swaps the flat fee and the per-kilometre rate). Misconception: The flat starting fee and the per-unit rate are assigned to the wrong roles.

10. Find the slope of the line through $(2,3)$ and $(5,12)$. Then state whether the line rises or falls from left to right.

10. $m=3$; rises from left to right Likely wrong answer: $m=3$ stated but described as falling left to right. Misconception: A positive slope value is correctly found but misdescribed as decreasing rather than increasing.

11. Write an equation for a line perpendicular to $y=\frac{3}{4}x-1$ that passes through (0,2).

11. $y=-\frac{4}{3}x+2$ Likely wrong answer: $y=\frac{3}{4}x+2$ (uses the reciprocal without negating it). Misconception: Only the reciprocal is taken; the sign is not flipped for a perpendicular slope.

12. A student says the equation $y=-6+2x$ has slope -6 and y-intercept 2, because that is the order the numbers appear. Identify the student's error, then correctly identify the slope and y-intercept.

12. Rewritten in $y=mx+b$ order, $y=2x-6$. The slope is 2 and the y-intercept is -6. Likely wrong answer: (already given) slope -6, y-intercept 2. Misconception: An equation not already in $y=mx+b$ order is read left to right instead of being rearranged first.

13. Which line is steeper: $y=-5x+2$ or $y=3x-8$? Explain.

13. $y=-5x+2$ is steeper Likely wrong answer: $y=3x-8$ is steeper (compares the size of the y-intercept instead of the slope). Misconception: Steepness is judged by the constant term instead of the absolute value of the slope.

14. Non-Routine: A student says that the line $y=4x-2$ has a slope of -2 because -2 is the number attached to the line after the x-term. Is the student correct? Identify the slope and y-intercept, then list three points that lie on the line.

14. Correct answer: The student is not correct. In $y=4x-2$, the slope is $m=4$ and the y-intercept is $b=-2$. Example points: (0,-2), (1,2), and (2,6). Likely wrong answer: $m=-2$, $b=4$. Misconception: The student may read the constant as slope and the coefficient as intercept. Next move: Write the equation below $y=mx+b$ and identify coefficient and constant separately.

15. Non-Routine: A student finds the slope through (1,4) and (5,12) as $m=(12-4)/(1-5)=8/(-4)=-2$. The student says the line falls from left to right. Is the student correct? Identify the exact error, find the correct slope, and explain how the line changes from left to right.

15. Correct answer: The student is not correct. The numerator uses second point minus first point, but the denominator uses first x-value minus second. Keep the order consistent: $m=12-4/5-1=8/4=2$. The line rises 2 units for every 1 unit moved right. Likely wrong answer: $m=-2$. Misconception: The student may know the formula but use

different point orders. Next move: Label (x_1, y_1) and (x_2, y_2) , then subtract second minus first in both numerator and denominator.

Answer Key — Exit Ticket

1. $m=-3, b=4$
2. $m=2$
3. Vertical line $x=6$; undefined slope

Worksheet 1: Guided Practice

1. Slope 0; example $y=3$
2. Example points: $(0,2), (1,3), (2,4)$
3. $m=2$
4. Example point $(4,-3)$
5. $m=3, b=-2$
6. Example points: $(0,3), (1,1), (2,-1)$
7. $m=-1$
8. $m=2$
9. $m=-1, b=4$
10. Vertical; undefined slope
11. $m=0.4=2/5$
12. Example points $(1,-1), (2,2)$
13. Yes; both slopes 2
14. $-1/3$
15. Yes. $2(4)+1=9$.

Worksheet 2: Independent Practice

1. Example points: $(4,5), (8,8)$
2. Example points: $(0,-4), (1,-2), (2,0)$
3. $m=2$
4. $C=5g+30$; $m=5, b=30$
5. Example points: $(0,3), (1,2), (2,1)$
6. $m=-2$
7. $m=-4, b=9$
8. $P=18h$; example points $(0,0), (1,18), (2,36)$

9. Example points: (0,1), (2,2), (4,3)
10. Undefined
11. $m=0$, $b=-7$
12. $C=2.50k+4$; slope is rate, intercept is starting fee
13. Parallel
14. Example points: (0,2), (2,-1), (4,-4)
15. $m=0$
16. Vertical; undefined slope
17. $m=-3$; y-intercept 6
18. Run is 0, so slope is undefined
19. $1/2$
20. Yes

Worksheet 3: Mixed Practice & Application

Item 14 (Non-Routine)

Correct answer: The student is not correct. In $y=4x-2$, the slope is $m=4$ and the y-intercept is $b=-2$. Example points: (0,-2), (1,2), and (2,6).

Likely wrong answer: $m=-2$, $b=4$.

Misconception: The student may read the constant as slope and the coefficient as intercept.

Next move: Write the equation below $y=mx+b$ and identify coefficient and constant separately.

Item 15 (Non-Routine)

Correct answer: The student is not correct. The numerator uses second point minus first point, but the denominator uses first x-value minus second. Keep the order consistent: $m=(12-4)/(5-1)=8/4=2$. The line rises 2 units for every 1 unit moved right.

Likely wrong answer: $m=-2$.

Misconception: The student may know the formula but use different point orders.

Next move: Label (x_1, y_1) and (x_2, y_2) , then subtract second minus first in both numerator and denominator.

1. $C=5g+30$; \$90 for 12 GB; 9 GB for \$75
2. $y=-1/2x+4$; example points (2,3), (4,2)
3. $H=2d+3$; 23 cm after 10 days
4. Perpendicular
5. $S=80w+200$; 10 weeks
6. $m=-1$; falls from left to right
7. $y=-3x+4$

8. $x=3$; a vertical line has undefined slope
9. $C=0.75k+12$; \$27 for 20 km
10. $m=3$; rises from left to right
11. $y=-\frac{4}{3}x+2$
12. Rewritten in $y=mx+b$ order, $y=2x-6$. The slope is 2 and the y-intercept is -6.
13. $y=-5x+2$ is steeper
14. (see diagnostic above)
15. (see diagnostic above)