UNIT 1B • LESSONS 1–3 REVIEW **Name: _____ HR: _____**

Directions: Show substitution, calculations, and graphing work. Write final answers with correct notation.

QUICK REVIEW — Skills from earlier lessons WORKED ANSWERS

R1. Solve: 3(2x − 1) = 21	R2. Solve: 5 − 2x ≥ 13	R3. Simplify: 4(2x − 3) − 3x
6x − 3 = 21 6x = 24 **x = 4**	−2x ≥ 8 Divide by −2 and reverse ≥. **x ≤ −4**	8x − 12 − 3x **5x − 12**

LESSON 1 — Function Notation and Modeling

1. Given f(x) = −3x + 7, find f(−4). Show substitution.

f(−4) = −3(−4) + 7
= 12 + 7
= 19

2. Given g(x) = x² − 2x + 1, find g(−3). Show substation.

g(−3) = (−3)² − 2(−3) + 1
= 9 + 6 + 1
= 16

3. Given h(x) = 2x − 5, find and simplify h(x + 4).

h(x + 4) = 2(x + 4) − 5
= 2x + 8 − 5
= 2x + 3

4. Given p(x) = x² + 3, find p(x − 2). Do not simplify.

p(x − 2) = (x − 2)² + 3

5. A parking garage charges $6 to enter plus $2.50 per hour. Let C(t) be the total cost for t hours. Write C(t) and evaluate C(4).

C(t) = 6 + 2.50t
C(4) = 6 + 2.50(4)
= 6 + 10 = $16

6. A tank starts with 90 liters and loses 6 liters each minute. Write V(t), evaluate V(8), and state a reasonable domain until empty.

V(t) = 90 − 6t
V(8) = 90 − 6(8) = 42 liters
Empty when 90 − 6t = 0.
6t = 90, so t = 15 minutes.
Domain: 0 ≤ t ≤ 15 (t in minutes)

LESSON 2 — Slope and Average Rate of Change

7. Find the slope through (−4, 2) and (2, 8). Describe the direction.

$m = \frac{8 - 2}{2 - (-4)} = \frac{6}{6}$ **= 1**

The line rises from left to right.

8. Find the slope through (3, −5) and (3, 4). Classify the line.

$m = \frac{4 - (-5)}{3 - 3} = \frac{9}{0}$ **(undefined)**

The line is vertical.

9. Find the slope using the table:

x	$f(x)$
0	7
2	3
5	-3

Use (0, 7) and (2, 3).

$m = \frac{3 - 7}{2 - 0} = \frac{-4}{2}$ **= −2**

Check: (−3 − 3)/(5 − 2)
= −6/3 = −2

10. Find average rate of change of f(x) = x² − 4x + 2 from x = 1 to x = 5.

f(1) = 1² − 4(1) + 2 = −1
f(5) = 5² − 4(5) + 2 = 7

Ordered pairs: (1, −1) and (5, 7)

Slope $= \frac{7 - (-1)}{5 - 1} = \frac{8}{4}$ **= 2**

Average rate of change = 2.

UNIT 1B • LESSONS 1–3 REVIEW (BACK) **Name:** _____

LESSON 2 — Rate of Change in Context

WORKED ANSWERS

11. A candle is 18 cm tall and burns at a constant rate. After 4 hours, it is 14 cm tall. Find and interpret the rate of change, including units.

Ordered pairs (hours, cm): (0, 18) and (4, 14)

Slope = $\frac{14-18}{4-0} = \frac{-4}{4}$ **= −1 cm per hour**

Write a function H(t) where H is the height of the candle in cm and t is the time it has been burning in hours.

H(t) = 18 − t Height drops 1 cm each hour.

12. The water in a pond is modeled by W(t) = 80 − 6t + t². Find the average rate of change from t = 1 to t = 4. State whether the amount increased or decreased on average.

W(1) = 80 − 6(1) + 1² = 75

W(4) = 80 − 6(4) + 4² = 72

Ordered pairs: (1, 75) and (4, 72)

Slope = $\frac{72-75}{4-1} = \frac{-3}{3}$ **= −1**

Average rate of change = −1. Decreased on average.

LESSON 3 — Graphing Linear Equations

For problems 13–18, graph each line on your own coordinate grid. Identify two points used.

13. $y = 2x - 3$

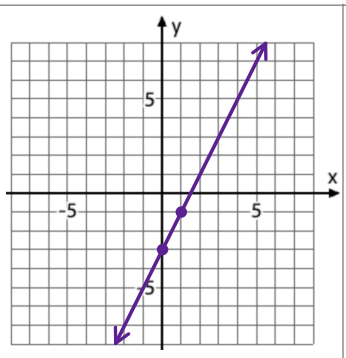
Slope: **2**

y-intercept: **(0, −3)**

Two points:

(0, −3), (1, −1)

From (0, −3): right 1, up 2.



14. $f(x) = -\frac{1}{2}x + 4$

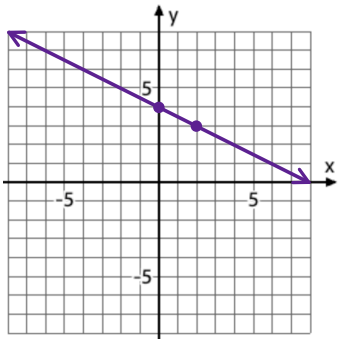
Slope: **−½**

y-intercept: **(0, 4)**

Two points:

(0, 4), (2, 3)

From (0, 4): right 2, down 1.



15. $2x + y = 6$

Rewrite in slope-intercept form first.

2x + y − 2x = 6 − 2x

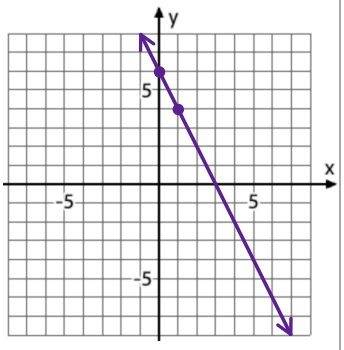
y = −2x + 6

Start at (0, 6).

Go right 1, down 2.

Two points:

(0, 6), (1, 4)



16. 3x + 2y = 12

Find both intercepts, then graph.

x-int: **(4, 0)**

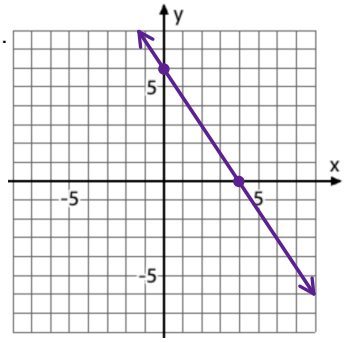
Set y = 0.

3x = 12, so x = 4.

Set x = 0.

2y = 12, so y = 6.

y-int: **(0, 6)**



17. Graph x = −2.

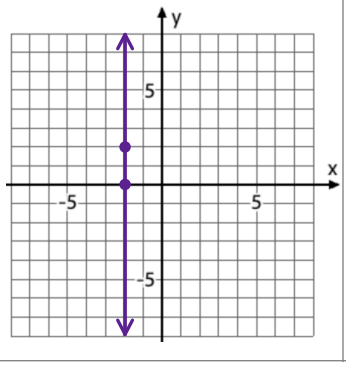
Slope: **Undefined**

Points: (−2, 0), (−2, 2)

m = (2 − 0)/(−2 − (−2))

= 2/0, so m is undefined.

Type of line: **Vertical**



18. Graph y = 5

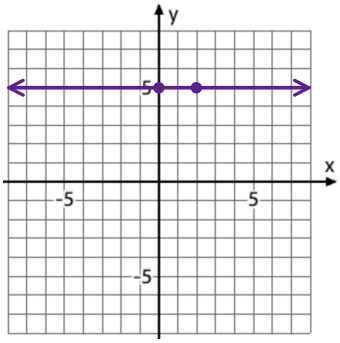
Slope: **0**

Points: (0, 5), (2, 5)

m = (5 − 5)/(2 − 0)

= 0/2 = 0

Type of line: **Horizontal**



APPLICATIONS — Write the function first

19. A fishing line is 120 inches long and stretches 0.35 inches per pound. **Write** $L(w)$**.** Find L(20). Identify the slope and its meaning.

L(w) = 120 + 0.35w

L(20) = 120 + 0.35(20) = 127 inches.

Slope = 0.35 inch per pound.

Each extra pound adds 0.35 inch to the length.

20. A student has $35 and earns $15 per hour. Write $M(h)$. How many hours until the student has $140? **Show an equation** and solve.

M(h) = 35 + 15h

35 + 15h = 140

15h = 105

h = 7 hours