

Unit 2 Overview Guide

Check Your Understanding — Answer Key

For open questions, a correct response gives the same values with the reasoning in the student's own words. Justifications must use attributes of the relationship, not just the answer.

#	Answer
1	Missing $x = 5$; missing $y = 36$ ($k = 4.5$)
2	$y = 6.75x$; $k = 6.75$ ($\$40.50 \div 6$) — each poster costs \$6.75
3	A ($y/x = 4.5$ in every row; B and D have an initial value, C is nonlinear)
4	Line through $(0, 0)$, $(2, 5)$, $(4, 10)$, $(6, 15)$ ($y = 2.5x$)
5	D
6	6, 7.5, 9, 12
7	Line through $(0, 20)$, $(4, 15)$, $(8, 10)$ — starts at 20, falls 1.25 per ride
8	Nonproportional; Proportional; Proportional; Nonproportional
9	B
10	D
11	1, 3, 5, 7.5 ($k = 0.25$); a 30-pound weight stretches it 7.5 inches
12	A ($k = 3.5$; $14 \cdot 3.5 = 49$)
13	9 pounds ($k = 11.25/5 = 2.25$; $20.25 \div 2.25 = 9$)
14	Nonproportional — the rate of change is constant (+3 per +1 in x) but y/x is not constant (3.5, 3.25, ≈ 3.17), so the line would not pass through the origin
15	D
16	Nonproportional — y/x differs (4.25, 3.5, ≈ 3.36); the rate is a constant \$3 per mile with a \$2.50 starting charge, so the graph would not pass through the origin
17	C ($k = 1.75$; $12 \cdot 1.75 = 21$)
18	(a) $y = 2.5x$ (b) the graph is a straight line that passes through the origin, and y/x is the same (2.5) at every marked point
19	A
20	Lane Ten is proportional: $y/x = 7$ in every column, so $y = 7x$ and the line passes through $(0, 0)$. Strike Zone is not: $b = 10 \neq 0$. The student is not correct — at 2 games Lane Ten costs \$14 and Strike Zone \$19; both cost \$28 at 4 games; Strike Zone costs less only from 5 games on (\$32.50 vs. \$35).
21	C
22	Nonproportional; Proportional; Nonproportional; Proportional
23	Not correct — a straight line is proportional only if it passes through the origin. Sample: $y = 2x + 3$ is a straight line, but $(0, 3)$ is on the line, and y/x is not constant.

#	Answer
24	$y = -18x + 750$ (or $y = 750 - 18x$)
25	rate = $(60 - (-30))/(25 - 10) = 6$ dollars per ticket; $b = -30 - 6(10) = -90$; $y = 6x - 90$ (the -90 is the stage rental)
26	B
27	$y = 2.5x + 4$
28	C
29	$b = 17 + 0.6(5) = 20$ cm at the start; $y = -0.6x + 20$
30	B ($m = (22.75 - 10.25)/(8 - 3) = 2.50$; $b = 10.25 - 2.50(3) = 2.75$)
31	(a) $y = 8x + 12$ (b) $y = 6x + 15$ (c) $y = -4x + 25$ (d) $y = 7x + 2$
32	$y = 2.75x$; $b = 0$
33	D
34	rate = $(48 - 76)/(3 - 1) = -14$; $b = 76 + 14 = 90$; $y = -14x + 90$
35	Not correct — the two numbers are swapped. The shoot was 32 cm long when measured and grows 2.5 cm each day. Day 12: $32 + 2.5(12) = 62$ cm.
36	A
37	Student A. Rate = $(4 - 1)/(4 - (-2)) = 3/6 = 0.5$; $0.5(-2) + 2 = 1$ and $0.5(4) + 2 = 4$. Student B's line passes through $(-2, 1)$ but $2(4) + 5 = 13 \neq 4$ (B inverted the rate).
38	Tank P: $y = 4x + 30$; Tank Q: $y = 7x + 18$. Greater rate: Q (7 gallons per minute fills faster). Greater starting value: P (30 gallons already in the tank at $x = 0$).
39	B
40	Any set with an input repeated with two different outputs, e.g. $\{(1, 2), (3, 4), (5, 6), (1, 8)\}$ — the input 1 has two outputs.
41	Function — every input has exactly one output; two inputs sharing an output does not break the rule
42	Not a function — the input 5 maps to two outputs (4 and 7)
43	Not a function — $x = 2$ pairs with both 3 and -1
44	C (only $(4, 7)$ uses a new input)
45	Not correct — the inputs $-3, 0, 2, 4$ are all different, so each input still has exactly one output; repeated outputs are allowed. A point that breaks it reuses an input with a new output, e.g. $(0, 7)$.
46	D ($x = 3$ maps to both 2 and 11)
47	Mapping: $2 \rightarrow 4, 3 \rightarrow 4, 5 \rightarrow 9$. Function — each input has exactly one arrow leaving it.
48	A (each student has exactly one date of birth; B, C, D pair one input with more than one possible output)
49	Not a function — $(-1, 2)$ and $(-1, -2)$ show the input -1 with two outputs
50	Not correct — order does not matter; the inputs 5, 1, 4, 2 each have exactly one output, so it is a function. Mapping: $1 \rightarrow 3, 2 \rightarrow 0, 4 \rightarrow 8, 5 \rightarrow 3$.

#	Answer
51	(a) $(3, 5)$ (b) $2(3) - 1 = 5$ ✓ and $-(3) + 8 = 5$ ✓
52	B $(2 + 3 = 5$ and $3(2) - 1 = 5)$
53	(a) $(5, 60)$ (b) 5 is the number of visits at which both gyms cost the same; 60 is that shared cost, \$60
54	Both lines drawn; intersection at $(2, 3)$
55	C
56	Not correct — first equation: $-4 + 6 = 2$ ✓; second equation: $0.5(4) + 1 = 3 \neq 2$. The pair satisfies only one equation, so it is not the solution.
57	D
58	Row $y = 2.5x$: 5, 10, 15. Row $y = 1.5x + 4$: 7, 10, 13. Intersection $(4, 10)$ — at $x = 4$ both equations give the same y , so the graphs meet there.
59	Answers vary. Sample: two gyms' total cost in dollars for x months; 3 is the number of months at which both cost the same, and 27 is that shared cost, \$27. (Any situation with two linear quantities equal at $x = 3$, $y = 27$.)
60	Not correct — second equation: $-5 + 6 = 1$ ✓; first equation: $3(5) - 2 = 13 \neq 1$. The point is on only one line; the solution is the point of intersection, $(2, 4)$.