Comparing Functions

Name: _____	Date: _____	Score: _____ / 31

Quick Review

Functions may be shown by equations, graphs, tables, or words. To compare them, put the important feature in the same form first: rate of change, starting value, maximum or minimum, zeros, or a value at a chosen input. From a table, use $\frac{\Delta y}{\Delta x}$. From a graph, read the slope or key point from the picture.

PRACTICE

Read each situation and compare the requested feature.

1. A copy shop charges $C(n) = 15 + 0.08n$ dollars for n flyers. The school office charges $\$23$ for 100 flyers, $\$31$ for 200, and $\$39$ for 300. Are the two pricing rules the same?

_____

2. Two fundraiser teams report their totals. Team A has $\$180, \$235, \$290$ after days $0, 1, 2$. Team B is modeled by $B(d) = 150 + 60d$. Which team has raised more by day 4?

_____

3. Blue Bikes charges $\$6$ to unlock a bike and $\$3$ per hour. Green Bikes lists $\$11, \$14, \$17$ for $1, 2, 3$ hours. Which company has the lower starting fee?

_____

4. A coffee subscription costs $A(b) = 14 + 3b$ dollars for b bags of coffee. A local roaster charges $\$20, \$22.50, \$25$ for $0, 1, 2$ bags. Which subscription has the lower cost per bag?

_____

5. A streaming service charges $18m$ dollars for m months. Another service costs $\$27, \$42, \$57$ after months $1, 2, 3$. Which service is cheaper after 6 months?

_____

6. Pool A has $V_A(t) = 5000 - 350t$ gallons after t hours. Pool B has $4800, 4000, 3200$ gallons after $0, 2, 4$ hours. Which pool is draining faster?

_____

7. One test-prep app predicts a score of $120 + 15w$ after w weeks. Another app reports scores $90, 112, 134$ after weeks $0, 1, 2$. Which app is improving faster?

_____

8. Section A of a concert hall earns $R_A(n) = 28n$ dollars for n tickets. Section B reports $\$310, \$560, \$810$ for $10, 20, 30$ tickets. Which section earns more from 40 tickets?

_____

9. Plan A for phone data costs $28 + 0.05t$ dollars for t texts. Plan B costs $\$20, \$29, \$38$ for $0, 100, 200$ texts. Which plan is cheaper at 300 texts?

_____

10. Driver A earns $18 + 5d$ dollars for d deliveries. Driver B earns $\$34, \$48, \$62$ for $2, 4, 6$ deliveries. Who earns more for 8 deliveries?

_____

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11. A tank-fill station has $A(t) = 15 + 4t$ gallons after t minutes. Station B has $10, 24, 38$ gallons after $0, 2, 4$ minutes. Which station reaches 60 gallons first?

12. Booth A at a bake sale has profits $\$35, \$47, \$59$ for $0, 1, 2$ batches sold. Booth B has profit $P(b) = 28 + 14b$. Which booth makes more per batch?

13. Data Plan A costs $45 + 8g$ dollars for g GB of data. Plan B costs $\$60, \$66, \$72$ for $0, 1, 2$ GB. Which plan is cheaper for 5 GB?

14. Landscaper A charges $75 + 22y$ dollars for y yards. Landscaper B charges $\$100, \$118, \$136$ for $1, 2, 3$ yards. Which landscaper has the lower rate per yard?

15. A museum pass costs $\$90$ for the year plus $\$5$ per visit. Without the pass, each visit costs $\$17$. What is the first whole number of visits where the pass is cheaper?

16. Runner A has distances $0, 1.2, 2.4$ miles after $0, 10, 20$ minutes. Runner B's distance is $B(m) = 0.11m$. Who has gone farther after 30 minutes?

17. Line A at a warehouse packs $40 + 18h$ boxes after h hours. Line B packs $25, 46, 67$ boxes after $0, 1, 2$ hours. Which line packs boxes faster?

18. Account A has $250 + 18w$ dollars after w weeks. Account B has $\$160, \$280, \$400$ after weeks $0, 5, 10$. After how many weeks will the accounts have the same amount?

19. Cafeteria account A starts with $\$35$ and spends $\$4.50$ per day. Account B has $\$50, \$39, \$28$ after days $0, 2, 4$. Which account is dropping faster?

20. A theater compares two ticket plans. Plan A is $A(n) = 12n + 30$. Plan B costs $\$42$ for 1 ticket, $\$54$ for 2, and $\$66$ for 3. Are the plans the same function?

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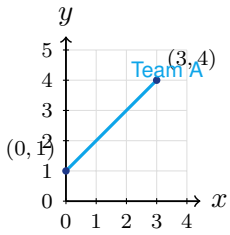
VISUAL PRACTICE

Use the graph, table, chart, or diagram to answer the question.

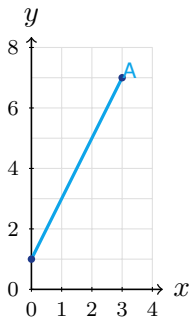
21. Two delivery teams record packages packed. Team A is graphed; Team B is shown in the table. Which team packs faster?



hours	0	1	2
Team B	2	5	8

Answer: _____

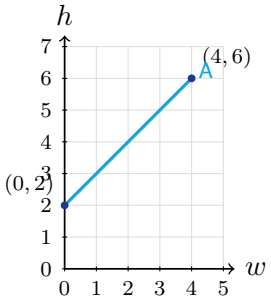
22. Two savings accounts are compared. Account A is graphed; Account B is in the table. Which account started with more money?



week	0	1	2
B	4	6	8

Answer: _____

23. A biology class compares two seedlings. Plant A is graphed; Plant B is shown in the table. Which plant is growing faster?



week	0	2	4
Plant B height	1	5	9

Answer: _____

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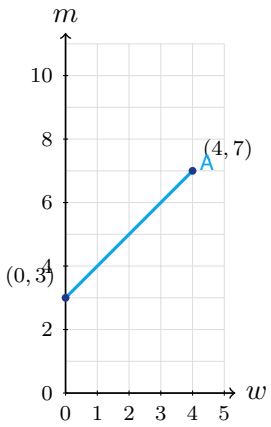
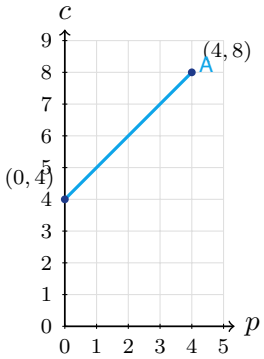
24. Two classes track fundraiser money in hundreds of dollars. Class A is graphed; Class B is shown in the table. Which class has more after 5 weeks?



week	0	2	4
Class B	1	5	9

Answer: _____

25. A student council compares poster-printing costs in tens of dollars. Store A is graphed; Store B is shown in the table. Which store has the lower starting fee?



posters	0	2	4
Store B cost	3	7	11

Answer: _____

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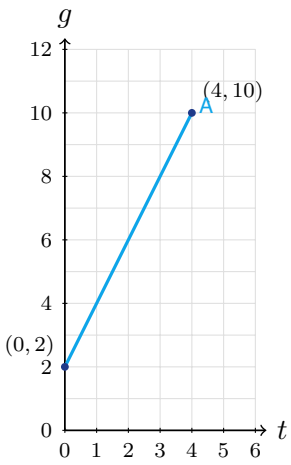
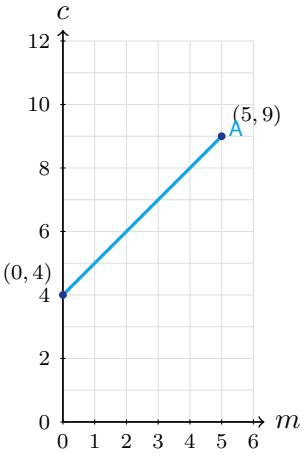
26. Two water tanks are filling. Tank A is graphed; Tank B is shown in the table. Which tank reaches 12 gallons first?



min	0	2	4
Tank B	0	5	10

Answer: _____

27. Two taxi companies compare fares in dollars. Cab A is graphed; Cab B is shown in the table. Which cab has the lower cost per mile?



miles	0	2	4
Cab B	6	9	12

Answer: _____

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Word Problems

28. A school is comparing two caterers for a banquet. Caterer A charges a $250 setup fee plus $18 per guest. Caterer B sent a quote table: 10 guests cost $410, 20 guests cost $590, and 30 guests cost $770. Which caterer has the lower setup fee, and which caterer is cheaper for 50 guests?

Model: _____ **Answer:** _____

29. A robotics club tests two batteries before a competition. Battery A has $A(t) = 96 - 6t$ percent charge after t hours. Battery B records $100, 91, 82, 73$ percent charge after $0, 1, 2, 3$ hours. Which battery loses charge faster, and which battery has more charge after 5 hours?

Model: _____ **Answer:** _____

30. The yearbook team compares two poster printers. Printer A charges a $40 setup fee plus $2.50 per poster. Printer B charges $55 for 10 posters, $80 for 20 posters, and $105 for 30 posters. Which printer has the lower setup fee, and which is cheaper for an order of 60 posters?

Model: _____ **Answer:** _____

31. At a stadium entrance, Gate A has already scanned 80 tickets and scans 22 more tickets each minute. Gate B has scanned 50, 78, 106, and 134 tickets after 0, 1, 2, and 3 minutes. Which gate is scanning faster, and after how many minutes will Gate B catch Gate A?

Model: _____ **Answer:** _____

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Answer Keys

1. yes
2. Team A
3. Blue Bikes
4. local roaster
5. second service
6. Pool B
7. second app
8. Section A
9. Plan A
10. Driver B
11. Station B
12. Booth B
13. Plan A
14. Landscaper B
15. 8 visits
16. Runner A
17. Line B
18. 15 weeks
19. Account B
20. yes
21. Team B
22. Account B
23. Plant B
24. Class B
25. Store B
26. Tank B
27. Cab A
28. B has the lower setup fee; B is cheaper
29. B loses charge faster; A has more after 5 hours
30. Printer B; Printer B
31. Gate B scans faster; 5 minutes

Step-by-Step Tutor Notes

1. The school office increases by $\$8$ per 100 flyers, or $\$0.08$ per flyer. Backing up to 0 flyers gives a $\$15$ setup fee, so the rules match.
2. Team A adds $\$55$ per day, so day 4 is $180 + 55(4) = 400$. Team B has $150 + 60(4) = 390$, so Team A is ahead.
3. Green Bikes increases by $\$3$ each hour, so its starting fee is $11 - 3 = \$8$. Blue Bikes starts at $\$6$, which is lower.
4. The first subscription adds $\$3$ per bag. The local roaster increases by $\$2.50$ per bag, so it has the lower per-bag cost.
5. The first service costs $18(6) = 108$. The second service has a $\$12$ setup fee and adds $\$15$ per month, so $12 + 15(6) = 102$.
6. Pool A loses 350 gallons per hour. Pool B loses 800 gallons in 2 hours, or 400 gallons per hour.
7. The first app increases by 15 points per week. The second app increases by 22 points each week.
8. Section A earns $28(40) = 1120$. Section B has rate $\$25$ per ticket and starts at $\$60$, so it earns $60 + 25(40) = 1060$.
9. Plan A costs $28 + 0.05(300) = 43$. Plan B increases by $\$9$ per 100 texts, so at 300 texts it costs $\$47$.
10. Driver A earns $18+5(8) = 58$. Driver B has rate $\$7$ per delivery and starting amount $\$20$, so $20 + 7(8) = 76$.
11. Station A reaches 60 when $15 + 4t = 60$, so $t = 11.25$. Station B adds 7 gallons per minute, so $10 + 7t = 60$ gives about 7.14 minutes.
12. This is a good place to slow down, check the notation, and simplify cleanly. Booth A increases by $\$12$ per batch. Booth B increases by $\$14$ per batch. So the answer is Booth B.
13. Plan A costs $45 + 8(5) = 85$. Plan B starts at $\$60$ and adds $\$6$ per GB, so $60 + 6(5) = 90$.
14. This is a good place to slow down, check the notation, and simplify cleanly. Landscaper A charges $\$22$ per yard. Landscaper B increases by $\$18$ per yard. So the answer is Landscaper B.
15. The pass is cheaper when $90 + 5v < 17v$, so $90 < 12v$. The first whole number above 7.5 is 8.
16. Runner A runs 0.12 mile per minute, so 30 minutes is 3.6 miles. Runner B runs $0.11(30) = 3.3$ miles.
17. This is a good place to slow down, check the notation, and simplify cleanly. Line A packs 18 boxes per hour. Line B increases by 21 boxes per hour. So the answer is Line B.
18. Account B grows by $\$24$ per week. Solve $250 + 18w = 160 + 24w$ to get $90 = 6w$, so $w = 15$.
19. Account A drops $\$4.50$ per day. Account B drops $\$11$ over 2 days, or $\$5.50$ per day.
20. Plan B has rate 12 and starts at $\$30$, matching $A(n) = 12n + 30$. They are the same function.
21. Team A has rate 1 package per hour. Team B has rate 3 packages per hour, so Team B is faster.
22. Use the clue in the question first, then let the arithmetic finish the job. Account A starts at 1, while Account B starts at 4. So the answer is Account B.
23. Plant A grows from 2 to 6 in 4 weeks, or 1 inch per week. Plant B grows 4 inches in 2 weeks, or 2 inches per week.
24. Class A starts at 3 and adds 1 hundred dollars per week, so week 5 is 8. Class B starts at 1 and adds 2 per week, so week 5 is 11.
25. Store A starts at 4 tens of dollars. Store B starts at 3 tens of dollars, so Store B has the lower starting fee.
26. Tank A fills at 2 gallons per minute and reaches 12 at 5 minutes. Tank B fills at 2.5 gallons per minute and reaches 12 at 4.8 minutes.
27. Cab A increases by $\$5$ over 5 miles, or $\$1$ per mile. Cab B increases by $\$3$ over 2 miles, or $\$1.50$ per mile.
28. Caterer B increases by $180 for each 10 guests, so its rate is $18 per guest. At 10 guests, the guest charge is $180, leaving a $230 setup fee. For 50 guests, A costs $250+$18(50)=$1150, while B costs $230+$18(50)=$1130.
29. Battery A loses 6 percent per hour. Battery B loses 9 percent per hour, so B drains faster. After 5 hours, A has $96 - 6(5) = 66\%$ and B has $100 - 9(5) = 55\%$, so A has more charge.
30. Printer B increases by $25 for 10 posters, so the rate is $2.50 per poster. At 10 posters, $25 is the poster charge, leaving a $30 setup fee. For 60 posters, A costs $40+$2.50(60)=$190, while B costs $30+$2.50(60)=$180.
31. Gate B increases by 28 tickets each minute, while Gate A increases by 22 tickets each minute. To catch up, solve $50 + 28m = 80 + 22m$. Then $6m = 30$, so $m = 5$ minutes.

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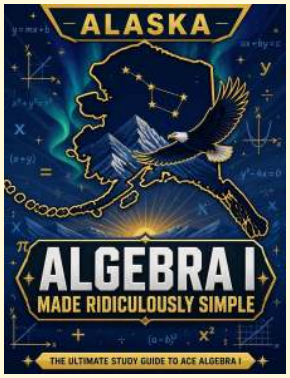

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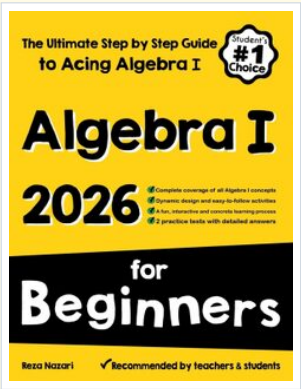

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