

# Comparing Functions

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 31

## Q 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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?

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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?



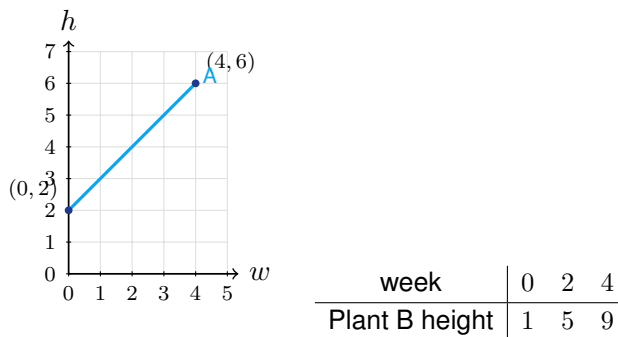
Answer: \_\_\_\_\_

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



Answer: \_\_\_\_\_

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



Answer: \_\_\_\_\_



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: \_\_\_\_\_



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

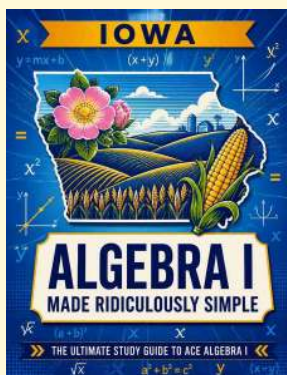
### Step-by-Step Tutor Notes

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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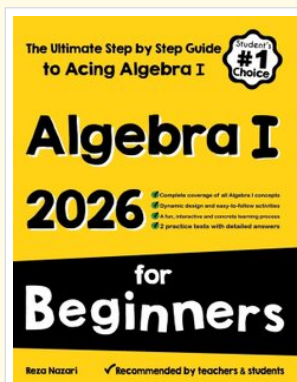
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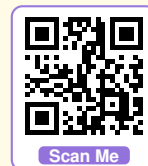
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