Comparing Two Functions

Apply the skill to decisions and designs

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Comparing plans requires both a starting amount and a per-unit change. For costs $C = 3h + 8$ and $D = 5h$, evaluate the same number of hours or solve $3h + 8 = 5h$ to find the equal-cost input. In context, restrict to meaningful inputs and distinguish a lower cost from a greater rate of change.

Worked example

Example for form 3: compare outputs. $A(x) = 2x + 3$ and $B(x) = 3x + 7$. Use $x = 2$.

1. Substitute the same input into both functions: $A(2) = 2(2) + 3 = 7$ and $B(2) = 3(2) + 7 = 13$.

2. The output difference is $A - B = 7 - (13) = -6$. B is greater at this input.

Answer: $A = 7$, $B = 13$; b is greater.

Practice Problems

Show your thinking.

1. Two bike plans cost A and B dollars for x hours. Compare the charges. $A(x) = 3x + 8$ and $B(x) = 5x + 2$. Use $x = 4$.

2. Two tanks have A and B liters after x minutes. Which has the greater signed filling rate? $A(x) = 2x + 12$ and $B(x) = 3x + 5$.

3. Two clubs model savings A and B dollars after x weeks. Who starts with more? $A(x) = 6x + 20$; the table defines linear function B.

x	y
0	5
2	21
4	37

4. Find the equal-cost hours for two rental designs. $A(x) = 4x + 12$ and $B(x) = 6x + 2$.

5. Two plants have A and B cm after x days. Compare heights. $A(x) = 2x + 7$; the table defines linear function B. Use $x = 6$.

x	y
0	2
2	8
4	14

6. Two water stores decrease by these rules. Which has the greater signed rate? $A(x) = -3x + 40$ and $B(x) = -5x + 50$.

7. Find the order size where two printing charges agree. $A(x) = 2x + 15$ and $B(x) = 5x + 0$.

8. Compare two fundraisers after x tickets, using net dollars. $A(x) = 4x - 10$ and $B(x) = 3x - 2$. Use $x = 10$.

9. A designer wants equal starting heights. Check the two height rules. $A(x) = 5x + 9$ and $B(x) = 2x + 9$.

10. Compare two routes after the same x minutes, in kilometers. $A(x) = 2x + 0$; the table defines linear function B. Use $x = 3$.

x	y
0	4
2	6
4	8

Answer Key

1. $A = 20$, $B = 22$; b is greater.
2. B; rates 2 and 3.
3. A; initial values 20 and 5.
4. $x = 5$, output 32.
5. $A = 19$, $B = 20$; b is greater.
6. A; rates -3 and -5.
7. $x = 5$, output 25.
8. $A = 30$, $B = 28$; a is greater.
9. Equal initial values; initial values 9 and 9.
10. $A = 6$, $B = 7$; b is greater.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Substitute the same input into both functions: $A(4) = 3(4) + 8 = 20$ and $B(4) = 5(4) + 2 = 22$.

2. The output difference is $A - B = 20 - (22) = -2$. B is greater at this input.

Problem 2

1. For A, a one-unit input increase changes the output by 2. For B, $\Delta y/\Delta x = (11 - (5))/(2 - 0) = 3$.

2. Compare the signed rates 2 and 3. $3 > 2$, so B has the greater rate of change.

Problem 3

1. Evaluate at input zero: $A(0) = 6(0) + 20 = 20$ and $B(0) = 8(0) + 5 = 5$.

2. These are the initial values, not the slopes. Comparing 20 with 5 shows A starts higher.

Problem 4

1. Set the outputs equal: $4x + 12 = 6x + 2$. Collect terms: $-2x = -10$.

2. Divide to get $x = 5$. Substitution gives $A(5) = 32 = B(5)$, so this input is the meeting point.

Problem 5

1. Substitute the same input into both functions: $A(6) = 2(6) + 7 = 19$ and $B(6) = 3(6) + 2 = 20$.

2. The output difference is $A - B = 19 - (20) = -1$. B is greater at this input.

Problem 6

1. For A, a one-unit input increase changes the output by -3. For B, $\Delta y/\Delta x = (40 - (50))/(2 - 0) = -5$.

2. Compare the signed rates -3 and -5. $-3 > -5$, so A has the greater rate of change.

Problem 7

1. Set the outputs equal: $2x + 15 = 5x + 0$. Collect terms: $-3x = -15$.

2. Divide to get $x = 5$. Substitution gives $A(5) = 25 = B(5)$, so this input is the meeting point.

Problem 8

1. Substitute the same input into both functions: $A(10) = 4(10) - 10 = 30$ and $B(10) = 3(10) - 2 = 28$.

2. The output difference is $A - B = 30 - (28) = 2$. A is greater at this input.

Problem 9

1. Evaluate at input zero: $A(0) = 5(0) + 9 = 9$ and $B(0) = 2(0) + 9 = 9$.

2. These are the initial values, not the slopes. Comparing 9 with 9 shows that both functions start at the same value.

Problem 10

1. Substitute the same input into both functions: $A(3) = 2(3) + 0 = 6$ and $B(3) = 1(3) + 4 = 7$.

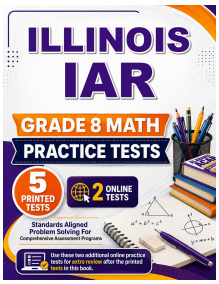
2. The output difference is $A - B = 6 - (7) = -1$. B is greater at this input.

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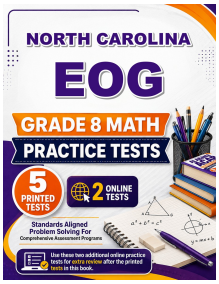
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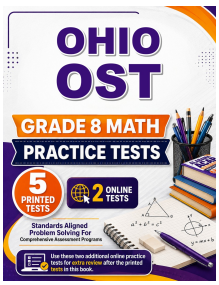
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