

Algebra 1  
Checking Linear Models and Contextual Solutions

Checking Linear Models and Contextual Solutions | A1-U02-P12

96 problems · Four activity formats

|    |                            |              |
|----|----------------------------|--------------|
| 01 | Answer Bank Challenge      | 24 tasks     |
| 02 | Grid Rounds                | 24 tasks     |
| 03 | Match & Move               | 24 cards     |
| 04 | Error Analysis & Strategy  | 24 tasks     |
| 05 | Quick Answer Key           | 96 answers   |
| 06 | Full Worked Solutions      | 96 solutions |
| 07 | Teacher / Parent Use Guide | included     |
| 08 | Terms of Use & License     | included     |

**Topic focus**  
Across 96 tasks this topic asks for justified interpretation.  
**8 PDFs and a README; 49 buyer pages.**

## Algebra 1

# Checking Linear Models and Contextual Solutions

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

|                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A table lists a \$12 entry fee and \$0.45 per mile for <math>m</math> miles. A student proposes <math>\frac{C}{m} = 12 + 0.45</math>. Use the units to decide whether this is a total-cost model and state the correct equation.</p> <p>_____</p> <p>Bank label: _____</p> | <p>For <math>n</math> equally spaced fence posts, a supplied formula gives spacing <math>r = \frac{360}{n-1}</math> feet. The site permits at most 31 posts. Determine <math>n</math>'s full contextual domain.</p> <p>_____</p> <p>Bank label: _____</p>             |
| <p>A 30-item split defines category counts <math>x</math> and <math>30-x</math>. One summary says <math>A</math> exceeds <math>B</math> by 8; another says <math>B</math> exceeds <math>A</math> by 4. Classify the information.</p> <p>_____</p> <p>Bank label: _____</p>    | <p>Solving <math>3.75b + 9 = 54</math> gives <math>b = 12</math> bottles. Orders must contain complete cartons of 8 bottles. Is 12 a feasible order size?</p> <p>_____</p> <p>Bank label: _____</p>                                                                   |
| <p>A student proposes 23 and 24 for two consecutive integers whose sum is 47. Verify both 'consecutive' and the sum.</p> <p>_____</p> <p>Bank label: _____</p>                                                                                                                | <p>A calculation shows 58 items needed, 9 per pack, and <math>\frac{58}{9} = 6.444\dots</math>. A student chooses 6 packs by nearest-number rounding. Audit the decision and quantify the shortage or surplus after repair.</p> <p>_____</p> <p>Bank label: _____</p> |
| <p>On a 180-km route, one equation returns <math>x = 68</math> for distance traveled and another returns <math>r = 112</math> for distance remaining. Determine whether they conflict.</p> <p>_____</p> <p>Bank label: _____</p>                                              | <p>A map table gives 7.5 cm and a scale of 4 km per map centimeter. Someone writes <math>d = \frac{7.5}{4}</math> km. Use unit cancellation to choose the correct operation and distance.</p> <p>_____</p> <p>Bank label: _____</p>                                   |

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Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

|                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Equation <math>-4c + 10 = 34</math> gives <math>c = -6</math>. Here <math>c</math> is a signed temperature change recorded in whole degrees. Judge the root without treating it as a count.</p><br><br><br><br><br><br><br><br><br><br> | <p>Four scores are 76, 88, 91, and <math>x</math>, and their exact average is 84. Is <math>x</math> uniquely determined? Verify the resulting total.</p><br><br><br><br><br><br><br><br><br><br>                                                           |
| <p>An appliance uses 1.5 kilowatts for <math>t</math> minutes, but <math>E = 1.5t</math> is labeled in kilowatt-hours. Rewrite <math>E</math> consistently in terms of <math>t</math>.</p><br><br><br><br><br><br><br><br><br><br>         | <p>An exact trophy-count equation has algebraic root <math>n = 7.4</math>. Should the result be rounded to 7 trophies, 8 trophies, or treated another way?</p><br><br><br><br><br><br><br><br><br><br>                                                     |
| <p>A model lists both <math>4x - 3 = 17</math> and <math>4x - 3 = 21</math> for the same quantity <math>x</math>. Classify the information as unique, insufficient, or incompatible.</p><br><br><br><br><br><br><br><br><br><br>           | <p>A decay model <math>14 - 2t = 14</math> gives <math>t = 0</math>. Because <math>t</math> is elapsed time since observation began, should zero be retained or discarded? Justify with the original equation.</p><br><br><br><br><br><br><br><br><br><br> |

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Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

|                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Incoming:</b> Report 3.7 meters.</p> <p>A transit card balance follows <math>B = 85 - 6.40r</math>, where <math>r</math> counts rides and the rider cannot spend beyond the initial balance. Give the feasible domain for <math>r</math>.</p> <p>Your response: _____</p>   | <p><b>Incoming:</b> <math>r</math> is an integer with <math>0 \leq r \leq 13</math>.</p> <p>During a ten-dose treatment, <math>d</math> records how many doses a patient has completed, including observations before the first and after the last dose. List the domain.</p> <p>Your response: _____</p>     |
| <p><b>Incoming:</b> No. The feasible values are 4, 5, 6, and 7.</p> <p>A supplied equation gives cable length <math>x = 3.746</math> meters. The measurement is to be reported to the nearest tenth of a meter. What should be reported?</p> <p>Your response: _____</p>          | <p><b>Incoming:</b> Display <math>83.5 \frac{km}{h}</math>.</p> <p>A temperature equation is valid only from 6:30<i>a.m.</i> through 3:00<i>p.m.</i> Let <math>t</math> measure hours since 6:30<i>a.m.</i> Translate the clock-time window into a domain for <math>t</math>.</p> <p>Your response: _____</p> |
| <p><b>Incoming:</b> Report approximately 121 square centimeters.</p> <p>A theater sold 260 tickets in all. Let <math>a</math> be the number of adult tickets. State the contextual domain for <math>a</math> without using any price information.</p> <p>Your response: _____</p> | <p><b>Incoming:</b> <math>-120 \leq h \leq 450</math>.</p> <p>For the supplied revenue equation <math>7s + 4(36 - s) = 198</math>, <math>s</math> counts \$7 seats and <math>36 - s</math> counts \$4 seats. Identify every domain restriction imposed by those two counts.</p> <p>Your response: _____</p>   |

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A calculation  $d = 48(2.5) = 120$  is numerically correct but reports '120 hours.' Diagnose and correct the answer unit.

A pump runs at 1.8 liters per minute for 50 seconds. A technician records 90 liters. Audit the time unit and calculate the volume.

A solution to the exact equation  $5n = 38$  says, 'n=7.6, so the answer is 8 boxes.' Diagnose the final step.

A \$120 service receives a 7.5% fee. A calculation uses  $F = 120 + 7.5(120)$ . Identify the interpretation error and find  $F$ .

## Checking Linear Models and Contextual Solutions

### Full Worked Solutions - excerpt

#### Worked example

**Problem.** A table lists a \$ 12 entry fee and \$ 0.45 per mile for  $m$  miles. A student proposes  $\frac{C}{m} = 12 + 0.45$ . Use the units to decide whether this is a total-cost model and state the correct equation.

**Answer.** The proposal mixes dollars per mile with dollars; total cost is  $C = 12 + 0.45m$  dollars.

#### Explanation and check.

Dividing total  $C$  by  $m$  changes its unit to dollars per mile, while the right side adds a dollar amount to a rate. Keeping the fixed total and multiplying the rate by miles gives compatible dollar terms.

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#### Worked example

**Problem.** For  $n$  equally spaced fence posts, a supplied formula gives spacing  $r = \frac{360}{n-1}$  feet. The site permits at most 31 posts. Determine  $n$ 's full contextual domain.

**Answer.**  $n$  is an integer with  $2 \leq n \leq 31$ .

#### Explanation and check.

A post count is integral. At least two posts are needed to create a spacing, which also keeps  $n - 1$  nonzero; the site supplies the upper bound 31.