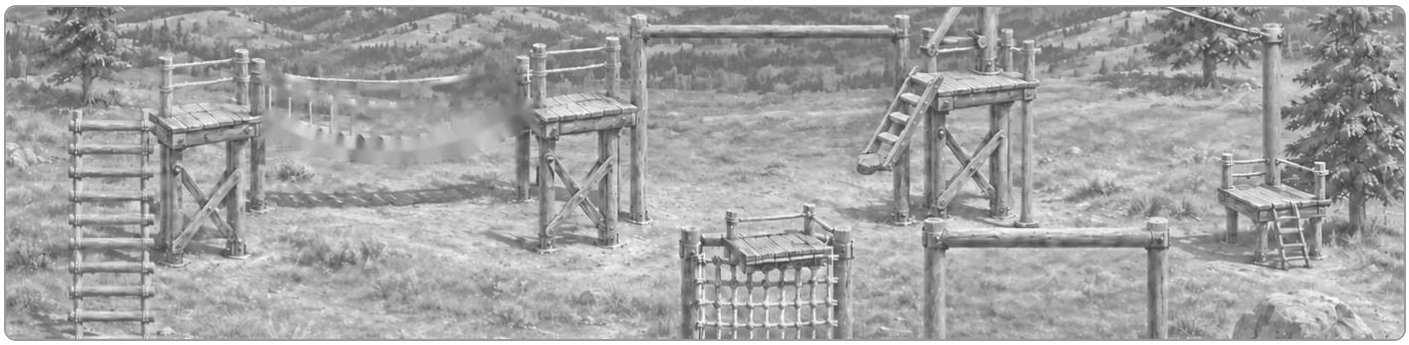
POLE MOUNTAIN LEARNING · PRINTABLE · NO DEVICE NEEDED

Ropes Course Equations: Course 1 of 4

Ropes Course · Grade 7



Name or class code _____ Date _____

Your trip

1. Solve each checkpoint. Show your thinking in the space beside the question.
2. Circle, write or fill in your answer on the question itself, then mark that checkpoint on the trip map.
3. Checkpoint 5 has two parts. Answer Part A, then Part B.
4. Your teacher checks each checkpoint. If you missed one, your teacher gives you the clue and you try again. Keep your first answer; write the new one beside it with a star (★).

① Cargo Ladder	② Swinging Bridge	③ Hanging Logs	④ Zip Line	⑤ Rings & Cargo Net
☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ A done ☐ B done ☐ fixed ★

Course Talk (bonus, not scored · do this after checkpoint 5): balance

The balance beam is a reminder to keep an equation **balanced**. In a balanced equation, both sides have equal value. Adding or subtracting the same amount on both sides keeps that equality.

If you subtract 3 from one side of an equation, what must you do to the other side to keep the equation balanced?

_____

_____

① Cargo Ladder

Add and subtract expressions

A puzzle card asks you to combine $(3x - 2) + (-5x + 7)$.

Which expression has the same value as the card's expression for every x?

(A) $8x + 5$

(B) $-2x + 5$

(C) $-2x - 9$

(2) Swinging Bridge

Equivalent expressions

Rewrite $(\frac{1}{2})(6x - 8)$.

Circle exactly TWO expressions that are equivalent for every value of the variable.

- [A] $3x - 8$
- [B] $3x - 4$
- [C] $3x + 4$
- [D] $6x - 4$
- [E] $-4 + 3x$

(3) Hanging Logs

Factoring linear expressions

Factor $6x - 9$ using an outside factor of 3.

Complete the factorization.

Circle one choice in each box.

$6x - 9 = 3($ [3 / 6 / 2] x [+ / −] $3)$

(4) Zip Line

Write and solve two-step equations

A temperature simulation starts at 7°C. In each of 3 equal time intervals, the temperature changes by x degrees. It ends at −5°C.

Build an equation from the situation, then solve for the change.

Circle one choice in each box.

A matching equation is [7 / 3 / −5] $x +$ [7 / −5 / 3] $=$ [−12 / 7 / −5]. Solving gives $x =$ [4 / −12 / −4].

(5) Rings & Cargo Net

Justifying equation steps

Start with $3(x - 2) = 12$.

Part A

Does each equation have the same solution as the original?

Mark one box in each row.

	Yes	No
$3x - 6 = 12$	☐	☐
$3x = 6$	☐	☐
$x - 2 = 4$	☐	☐

Part B

Which statement correctly describes how to expand $3(x - 2)$?

(A) Multiply 3 by x, then subtract 2 once.

(B) Add 3 to each term inside the parentheses.

(C) Multiply 3 by each term in parentheses.

POLE MOUNTAIN LEARNING · PRINTABLE · NO DEVICE NEEDED

Ropes Course Equations: Course 2 of 4

Pine Canopy · Grade 7



Name or class code _____ Date _____

Your trip

1. Solve each checkpoint. Show your thinking in the space beside the question.
2. Circle, write or fill in your answer on the question itself, then mark that checkpoint on the trip map.
3. Checkpoint 5 has two parts. Answer Part A, then Part B.
4. Your teacher checks each checkpoint. If you missed one, your teacher gives you the clue and you try again. Keep your first answer; write the new one beside it with a star (★).

① Rope Ladder	② Overhead Traverse	③ Swinging Logs	④ Balance Beam & Zip Line	⑤ Bridge & Cargo Net
☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ A done ☐ B done ☐ fixed ★

① Rope Ladder

Equations with parentheses

A puzzle card shows $2(x - 3) = 5$.

Find x.

Answer: _____

Write a number only. Write a minus sign for a negative answer. Leave out units.

② Overhead Traverse

Multi-step equations

Find the solution to $4(x - 2) + 3x = 13$.

What value makes the equation true?

Answer: _____

Write a number only. Write a minus sign for a negative answer. Leave out units.

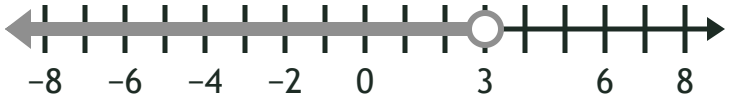
(3) Swinging Logs

Two-step inequalities

Solve $3x + 2 < 11$.

Choose the graph of all solutions.

(A)



(B)



(C)



(4) Balance Beam & Zip Line

Inequalities in context

A route puzzle costs 8 tokens to begin and 3 tokens per station. A team must complete at least 2 stations and spend at most 20 tokens. Let p count stations.

Circle exactly TWO station counts that meet BOTH requirements.

[A] 3
[B] 0
[C] 5
[D] 2
[E] 6

5 Bridge & Cargo Net

Equation reasoning

A model-course kit costs 6 credits plus 1.5 credits per marker. A kit with m markers costs 18 credits: 6 + 1.5m = 18.

Part A

How many markers are in the kit?

Answer: _____ markers

Write a number only. Write a minus sign for a negative answer. Leave out units.

Part B

A student calculates (18 − 6) × 1.5. Which correction gives a valid method?

(A) Divide the remaining 12 credits by the per-marker cost.

(B) Add the fixed 6 credits to 18, then multiply that total by 1.5.

(C) Multiply all 18 credits by the per-marker cost.

Course Talk (bonus, not scored): traverse

To **traverse** is to move across something. On the overhead traverse, the climber moves sideways along the bar, one hand at a time.

How does the climber traverse the overhead bar?

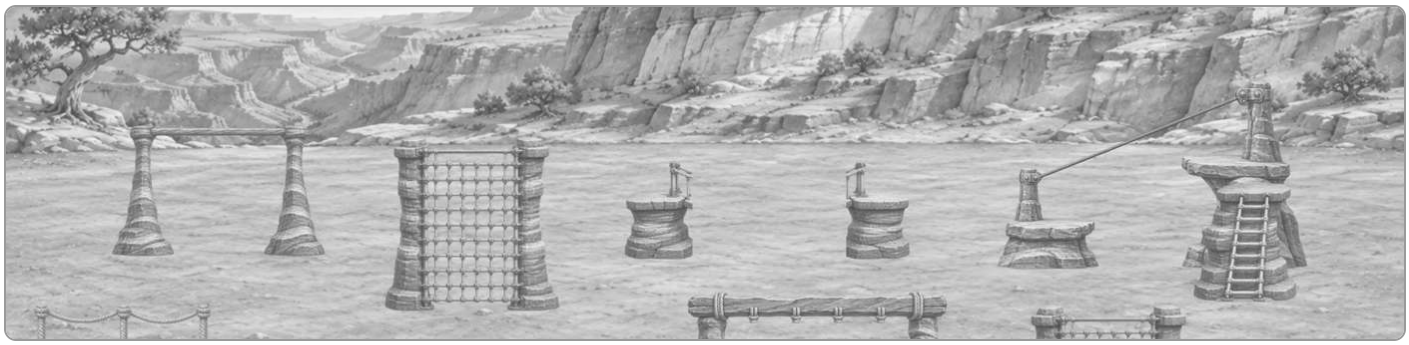
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POLE MOUNTAIN LEARNING · PRINTABLE · NO DEVICE NEEDED

Ropes Course Equations: Course 3 of 4

Moab Canyon · Grade 7



Name or class code _____ Date _____

Your trip

1. Solve each checkpoint. Show your thinking in the space beside the question.
2. Circle, write or fill in your answer on the question itself, then mark that checkpoint on the trip map.
3. Checkpoint 5 has two parts. Answer Part A, then Part B.
4. Your teacher checks each checkpoint. If you missed one, your teacher gives you the clue and you try again. Keep your first answer; write the new one beside it with a star (★).

1	2	3	4	5
Stairs & Beam	**Stone Steps**	**Cargo Net**	**Ladder & Zip Line**	**Bridge, Net & Traverse**
☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ done ☐ fixed ★	☐ A done ☐ B done ☐ fixed ★

1 Stairs & Beam

Add and subtract expressions

The next card shows (7y + 1) − (2y − 4).

Circle the equivalent expression.

A) 5y − 3
B) 9y − 3
C) 5y + 5

2 Stone Steps

Equivalent expressions

The expression on a route card is −2(3 − y).

Circle exactly TWO expressions that are equivalent for every value of the variable.

A) 2y − 6
B) −2y − 6
C) −6 + 2y
D) 2y + 6
E) −6 − y

(3) Cargo Net

Factoring linear expressions

Use an outside factor of −4 to factor −8y + 12.

Fill the coefficient and sign inside the parentheses.

Circle one choice in each box.

−8y + 12 = −4([−2 / 2 / 4] y [− / +] 3)

(4) Ladder & Zip Line

Write and solve two-step equations

At the start of an hour, a temperature is 3°C. It changes at a constant rate. Let y be the temperature change over the FULL hour. Halfway through the hour, the temperature is −1°C.

Build an equation from the situation, then solve for the change.

Circle one choice in each box.

A matching equation is [2 / $\frac{1}{2}$ / 3] y + [−1 / 4 / 3] = [−1 / 3 / −4]. Solving gives y = [−2 / −8 / 8].

(5) Bridge, Net & Traverse

Justifying equation steps

Compare each equation with −2(y + 3) = 8.

Part A

Does each equation have the same solution as the original?

Mark one box in each row.

	Yes	No
−2y − 6 = 8	☐	☐
−2y + 3 = 8	☐	☐
y + 3 = −4	☐	☐

Part B

Which operation keeps the equation true and removes the factor −2?

(A) Add 2 to both sides of the equation.

(B) Divide both sides of the equation by −2.

(C) Divide just the left side of the equation by −2.

Course Talk (bonus, not scored): pillar

A **pillar** is a tall, strong column that holds something up. On this course, a rock pillar holds up each end of the bridge.

What holds up the bridge on the Moab Canyon course?

_____

_____

POLE MOUNTAIN LEARNING · PRINTABLE · NO DEVICE NEEDED

Ropes Course Equations: Course 4 of 4

Alpine · Grade 7



Name or class code _____ Date _____

Your trip

1. Solve each checkpoint. Show your thinking in the space beside the question.
2. Circle, write or fill in your answer on the question itself, then mark that checkpoint on the trip map.
3. Checkpoint 5 has two parts. Answer Part A, then Part B.
4. Your teacher checks each checkpoint. If you missed one, your teacher gives you the clue and you try again. Keep your first answer; write the new one beside it with a star (★).

1	2	3	4	5
Stairs & Rope Traverse	**Hanging Logs**	**Bridges & Stairs**	**Cargo Net**	**Steps & Zip Line**
☐ done	☐ done	☐ done	☐ done	☐ A done ☐ B done
☐ fixed ★	☐ fixed ★	☐ fixed ★	☐ fixed ★	☐ fixed ★

1 Stairs & Rope Traverse

Equations with parentheses

The next equation is $-3(y + 2) = 4.5$.

Write the solution for y.

Answer: _____

Write a number only. Write a minus sign for a negative answer. Leave out units.

2 Hanging Logs

Multi-step equations

A route puzzle gives $3(2y + 1) - 2y = 3$.

Solve the equation for y.

Answer: _____

Write a number only. Write a minus sign for a negative answer. Leave out units.

(3) Bridges & Stairs

Two-step inequalities

Solve $-2x + 1 \leq 7$.

Choose the graph of all solutions.

(A)



(B)



(C)



(4) Cargo Net

Inequalities in context

A practice round started at 18 points before any wrong steps. Each wrong step subtracts 2 points. The team has now recorded 1 wrong step and wants to finish with more than 10 points. Let w be the TOTAL number of wrong steps by the end.

Circle exactly TWO possible final wrong-step counts that meet the score goal.

[A] 1
[B] 4
[C] 0
[D] 3
[E] 5

5 Steps & Zip Line

Equation reasoning

A weather-station calibration multiplies the difference between temperature s and 2°C by 4. The result is −10: $4(s - 2) = -10$.

Part A

Find the temperature s in degrees Celsius.

Answer: _____ degrees Celsius

Write a number only. Write a minus sign for a negative answer. Leave out units.

Part B

Which equation is a valid first step from the original?

(A) $4s - 2 = -10$

(B) $s - 2 = -2.5$

(C) $4s - 2 \times 4 = 10$

Course Talk (bonus, not scored): suspended

Something **suspended** hangs from above instead of resting on the ground. On the Alpine course, the logs and steps are suspended from ropes, so they swing when you step on them.

Why do the suspended steps swing when you step on them?

_____

_____