Circles within figure skaters'

Blade Tracings: Integrating Geometry & Algebra

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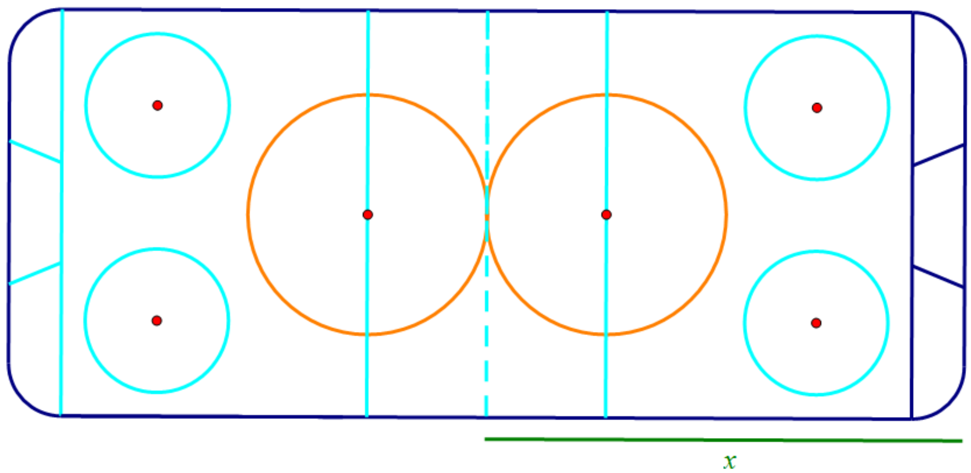
Moves in the Field Worksheet

Directions: Answer the questions related to each Move in the Field. Please note that a tracing includes only the solid orange curves; the other lines are hockey markings painted on the rink surface.You may use rulers and a calculator to solve the questions.

Move in the Field #1: Forward Circle Eight



1) Given the length of x, what is the length of one tracing (comprised of two congruent circles) in terms of x?

2) A NHL skating rink has the dimensions 200 ft x 85 ft. What is the length of one tracing (in feet)?

3) An Olympic Rink has dimensions 60 m x 30 m (1 meter is approximately 3.28084 feet). What is the length of one tracing (in feet)?

4) Suppose a skater can skate at an average rate of 3ft/sec. How long would it take for a skater to complete one tracing in an Olympic Rink? How long would it take for a skater to complete two tracings?

5) Suppose a skater can skate at an average rate of a ft/sec . How long would it take for a skater to complete one tracing in an Olympic Rink? How long would it take for a skater to complete two tracings in an Olympic Rink?

Common Core State Standards – Standards for Mathematical Practice

How does this activity address these CCSS Standards for Mathematical Practice?

1: Make sense of problems and persevere in solving them

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need.

Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2: Reason abstractly and quantitatively

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved.

Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

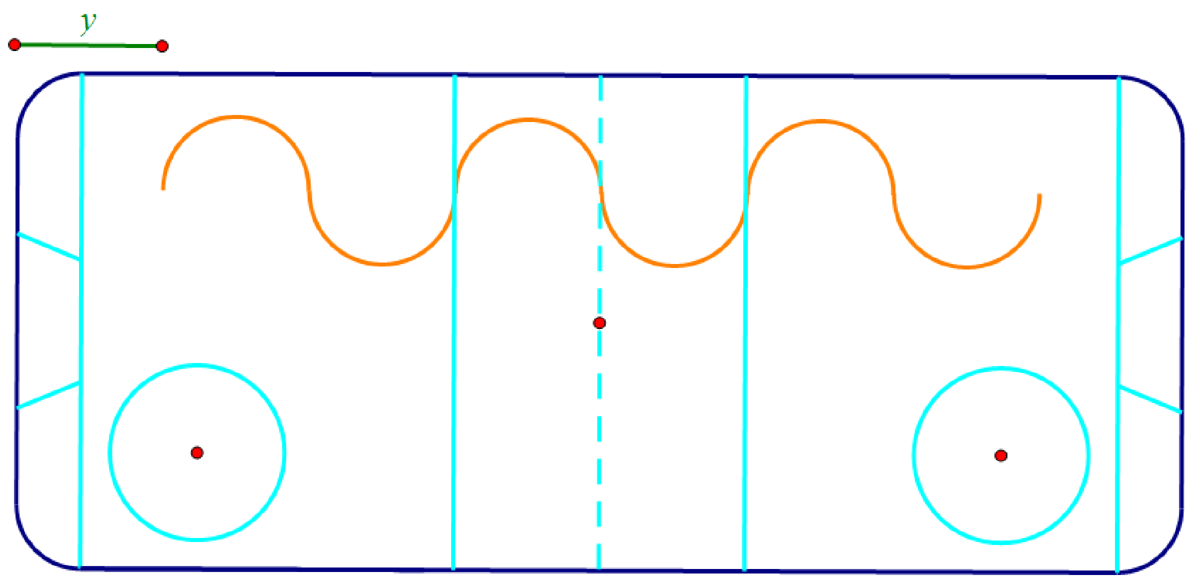
4: Model with mathematics

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community.

By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another.

Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Move in the Field #2: Alternating Consecutive Spirals



1) Given the length of y, what is the length of one tracing (comprised of 6 congruent semi-circles) in terms of y?

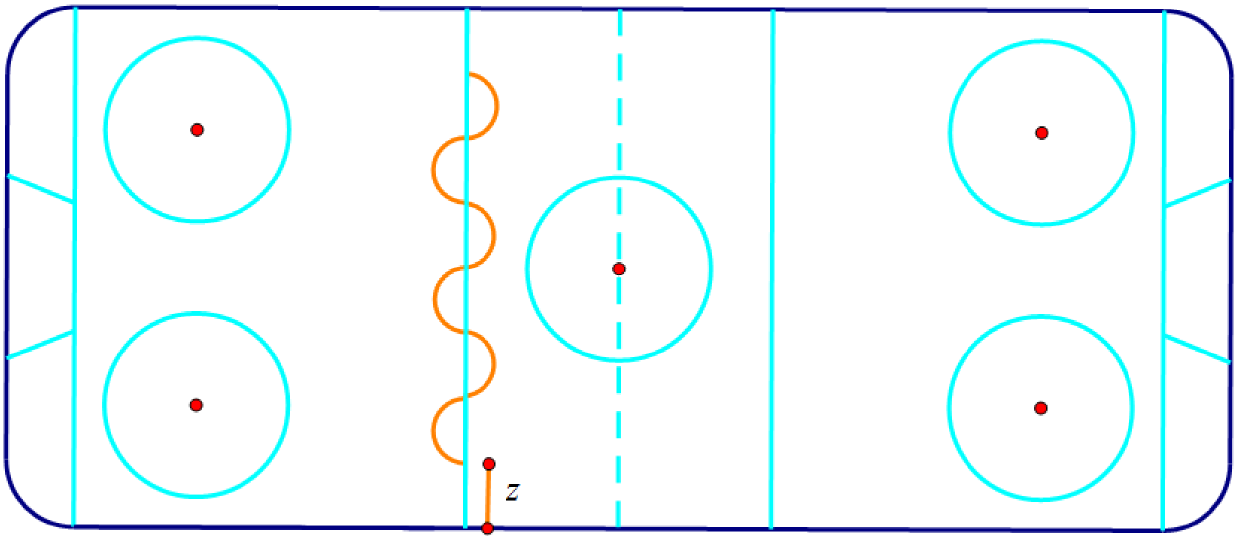
2) An NHL skating rink has the dimensions 200 ft x 85 ft. What is the length of one tracing (in feet)?

3) An Olympic Rink has dimensions 60 m x 30 m (1 meter is approximately 3.28084 feet). What is the length of one tracing (in feet)?

4) Suppose a skater can skate at an average rate of 3ft/sec. How long would it take for a skater to complete one tracing in an Olympic Rink? How long would it take for a skater to complete two tracings?

5) Suppose a skater can skate at an average rate of b ft/sec. How long would it take for a skater to complete one tracing in an Olympic Rink? How long would it take for a skater to complete two tracings in an Olympic Rink?

Move in the Field #3: Basic Consecutive Edges



6) Given the length of *z*, what is the length of one tracing (comprised of 6 congruent semi-circles) in terms of *z*?

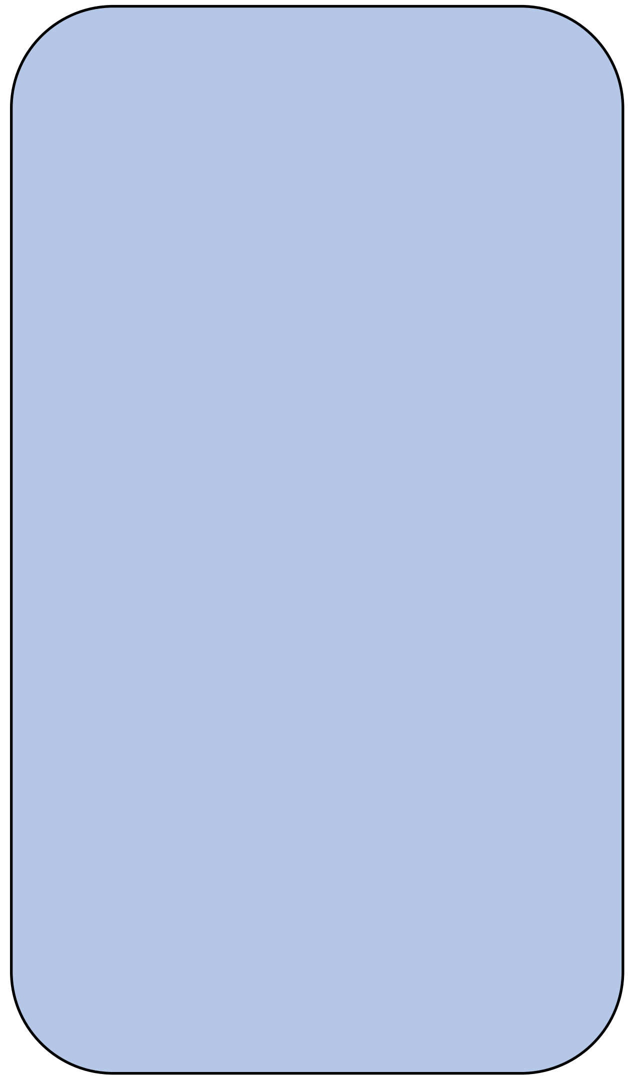
7) A NHL skating rink has the dimensions 200 ft x 85 ft. What is the length of one tracing (in feet)?

8) An Olympic Rink has dimensions 60 m x 30 m (1 meter is approximately 3.28084 feet). What is the length of one tracing (in feet)?

9) Suppose a skater can skate at an average rate of 3ft/sec. How long would it take for a skater to complete one tracing in an Olympic Rink? How long would it take for a skater to complete two tracings?

10) Suppose a skater can skate at an average rate of *c* ft/sec. How long would it take for a skater to complete one tracing in an Olympic Rink? How long would it take for a skater to complete two tracings in an Olympic Rink?

Move in the Field #4:



Design your own ice-skating move in the space provided and then answer the following questions accordingly.

1) Given the length of *x*, what is the length of one tracing in terms of *x*?

2) A NHL skating rink has the dimensions 200 ft x 85 ft, what is the length of one tracing (in feet)?

3) An Olympic Rink has dimensions 60 m x 30 m (1 meter is approximately 3.28084 feet). What is the length of one tracing (in feet)?

4) Suppose skater can skate at an average rate of 3ft/sec. How long would it take for a skater to complete one tracing in an Olympic rink?

5) Suppose a skater can skate at an average rate of *n* ft/sec. How long would it take for a skater to complete one tracing in an Olympic rink?