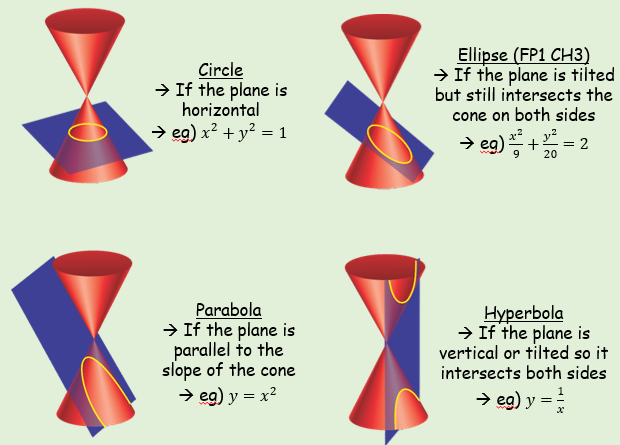
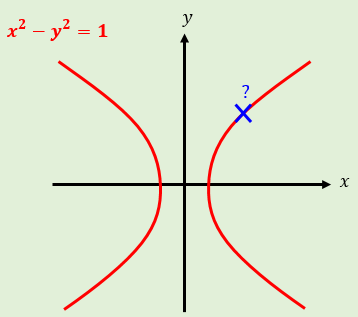
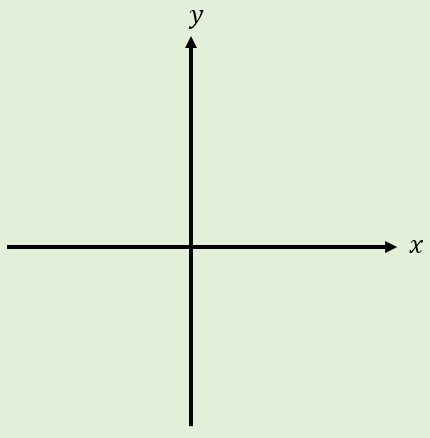
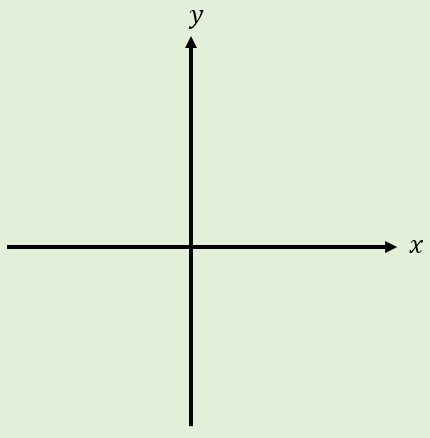
**6A Introduction to Hyperbolic Functions**

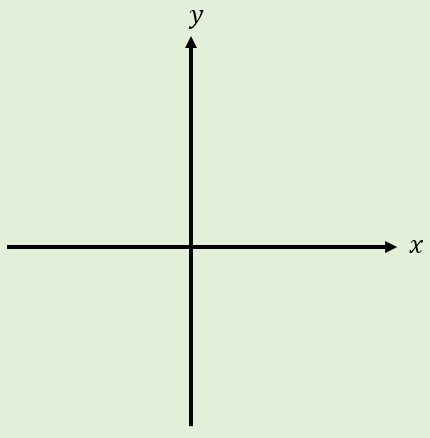




1. Find, to 2 decimal places, the value of:
2. Find the exact value of:
3. Find the value of for which . Give your answer to 2 decimal places.
4. Sketch hyperbolic function

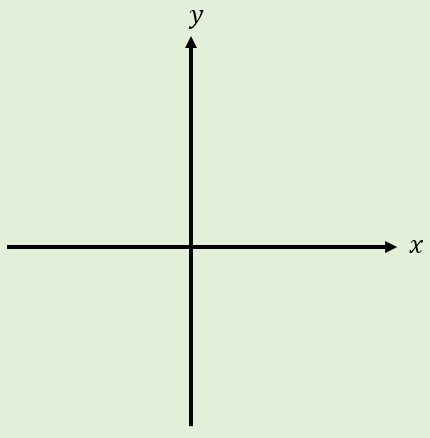


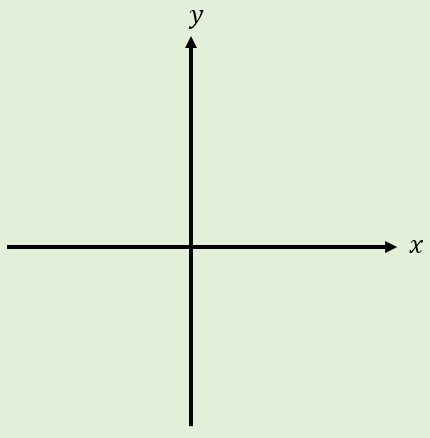


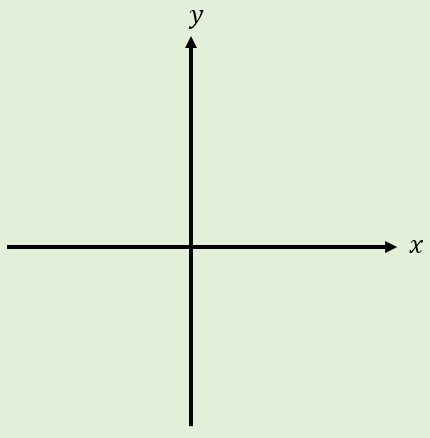


**6B Inverse Hyperbolic Functions**

1. Sketch hyperbolic function







1. Show that
2. Show that
3. Find an expression for using logarithms
4. Express using natural logarithms:

**6C Hyperbolic Equations and Identities**

1. Prove that:

Osborn’s Rule:

1. Write down the hyperbolic identity corresponding to:
2. Given that , find the exact value of:
4. Solve the equation below for real values of .
5. Solve the equation below, giving answers as natural logarithms.
6. Solve the equation below, giving answers as natural logarithms where appropriate.

Some additions to Osborn’s rule

**6D Differentiating Hyperbolics**

1. Show that
2. Show that
3. Show that
4. Differentiate with respect to
5. Differentiate with respect to
6. Given that:

Where and are constants, prove that

1. Show that
2. Given , find
3. Given , prove that:
4. Show that
5. Find the first two non-zero terms in the series expansion of
6. The general term for the series expansion of is given by:

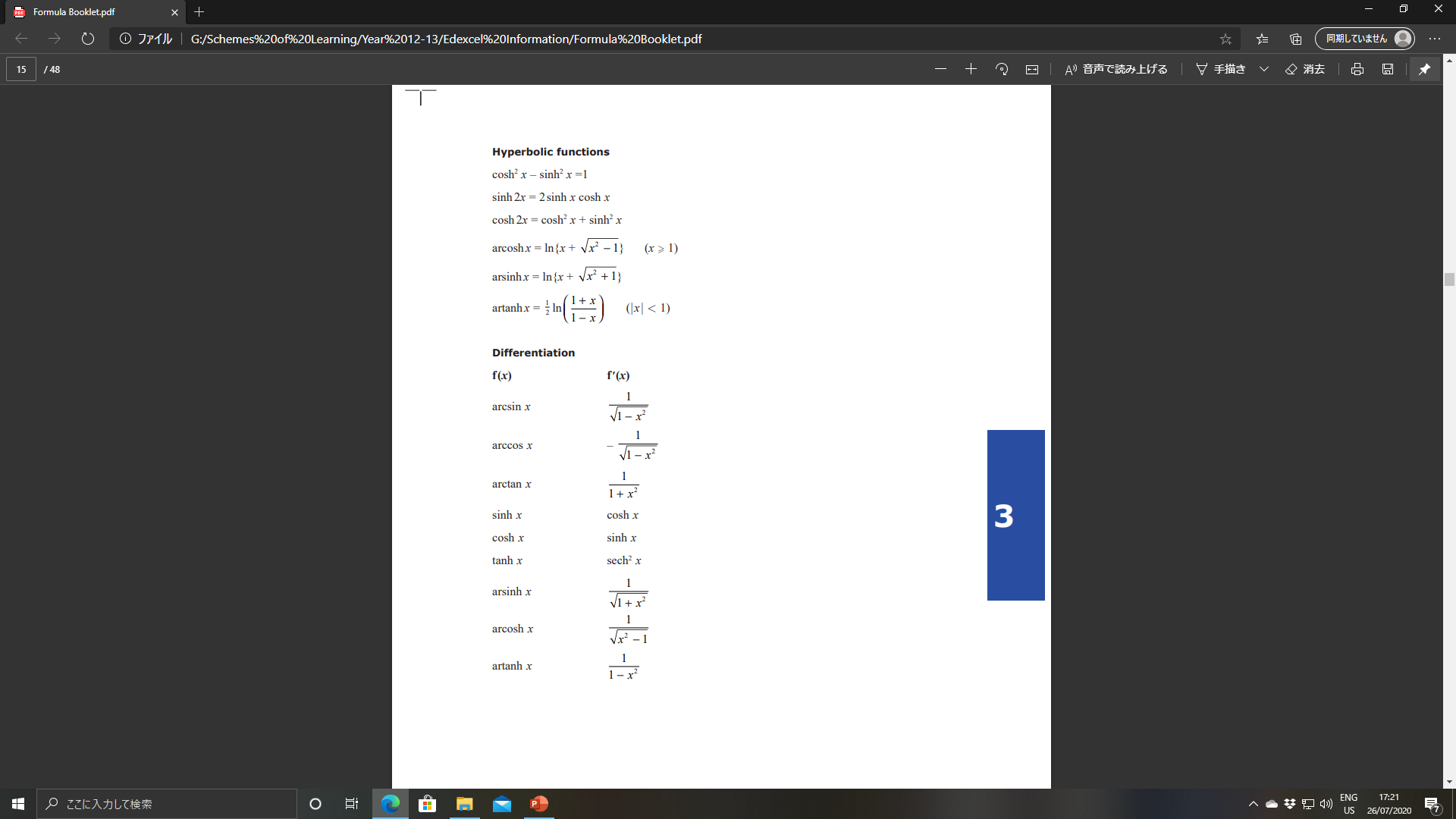
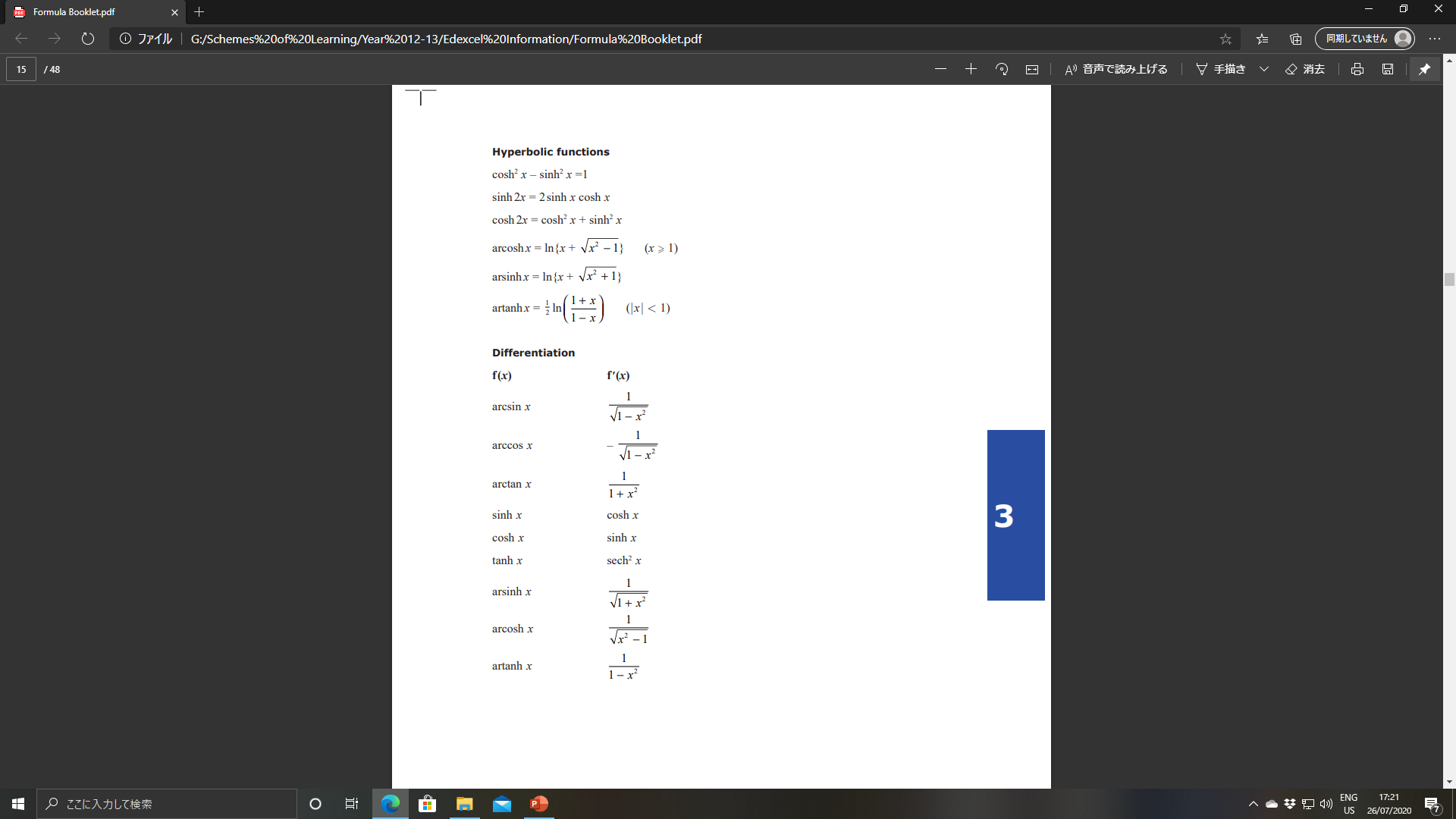
Find, in its simplest terms, the third term in the sequence

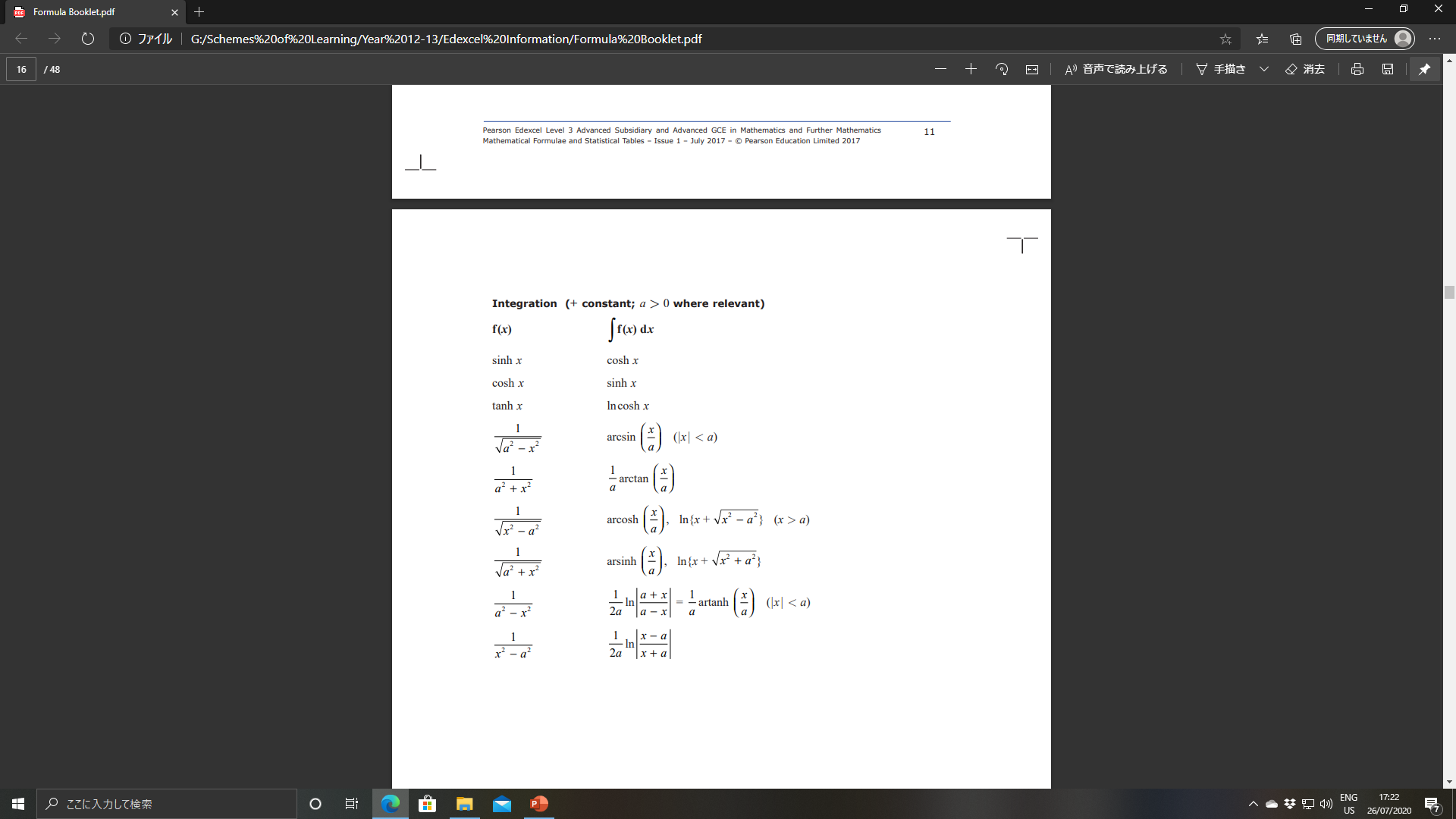
1. Use your approximation, up to and including the term in , to find an approximation for
2. Calculate the percentage error by using this approximation

**6E Integrating Hyperbolics**

1. Find
2. By using an appropriate substitution, find:

Formula book reference:





1. Show that
2. By using a hyperbolic substitution, evaluate:
3. Use the substitution

to find: