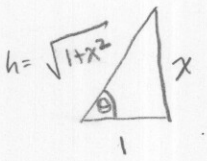
MATH 6 – QUIZ 8
13 APRIL 2012

Name: SOLUTIONS

NO CALCULATORS

1. Sketch a relevant right triangle and compute $\sin(\arctan x)$.



If $\theta = \arctan x$, we get the triangle on the left.

$1^2 + x^2 = h^2$, so $h = \sqrt{1+x^2}$.

Then $\sin\theta = \frac{\text{opp}}{\text{hyp}} = \boxed{\frac{x}{\sqrt{1+x^2}}}$

2. Factor and simplify the following trigonometric expression. The "best" answer is one where the expression is a constant times a positive power of a trigonometric function, but there are multiple acceptable answers.

$$\frac{\cos^2 x + 1}{\cos^4 x - 1}$$

$$\frac{\cos^2 x + 1}{\cos^4 x - 1} = \frac{\cos^2 x + 1}{(\cos^2 x + 1)(\cos^2 x - 1)}$$

$$= \frac{1}{\cos^2 x - 1}$$

$$= \frac{1}{-\sin^2 x}$$

$$= \boxed{-\csc^2 x}$$