Trig Substitution

Find the limit.

- $\int x\sqrt{4-x^2}\ dx$

- (a) Find $\frac{d}{dx}\sec x$

   (b) Use part (a) to find $\int \tan^5 x \sec x\ dx$

- Use hyperbolic substitution to find $\displaystyle\int \sqrt{x^2 - 1}\ x^3\ dx$

- Decompose the following into partial fractions:

  (a) $\dfrac{x}{(x+1)^2(x-3)(x^2+4)}$

  (b) $\dfrac{3x^2 + 7}{(x-5)(x^2 - 4x - 5)}$