

Example 1: Solve

$$2x^3 - 3x^2 - 5x + 6 = 0$$

Determine when f(x) > 0?

Example 2: Solve

$$x^3 - 4x^2 - x + 12 = 0$$

Example 3: Solve

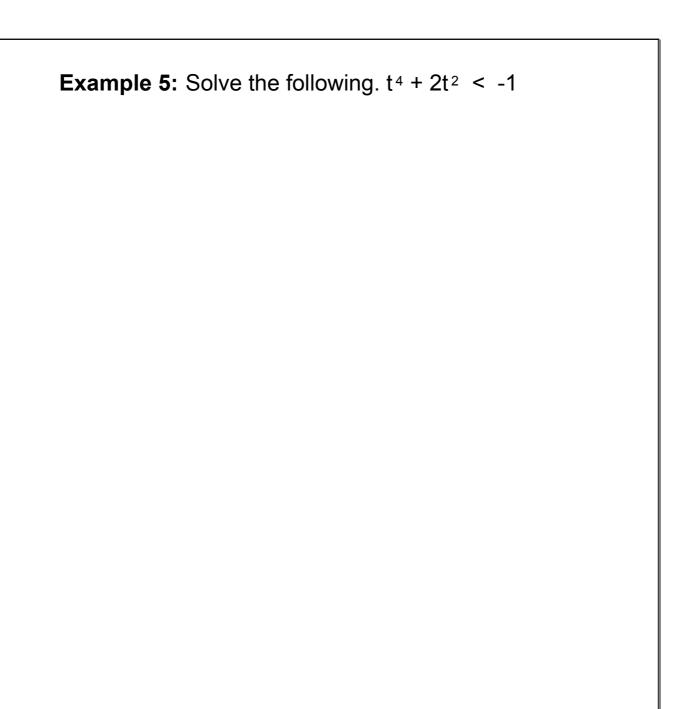
$$3x^4 - 12x^3 - 5x^2 = -20x$$

Example 4: Lelanie's family is planning to build a silo for grain storage, identical to those they have already on their farm. The cylindrical portion of those they currently have is 15 m tall, and the silo's total volume is 684_{π} m³. What are the possible values for the radius of the new silo?



$$V = V_{cylinder} + V_{hemisphere}$$
$$V = \pi r^2 h + 1/2 (4/3 \pi r^3)$$





Example 6: The path of two orcas playing in the ocean were recorded by the same oceanographers. The first orca's path could be modelled by the equation

$$h(t) = 2t^4 - 18t^3 + 28t^2 - 250 t + 250,$$

and the second by

$$h(t) = 19t^3 - 199t^2 + 298t - 182,$$

where h is their height above/below the water's surface in cmand t is the time during the first 8s of play.

Over this 8 second period, when is orca two higher than orca one?

Example 6: The path of two orcas playing in the ocean were recorded by the same oceanographers. The first orca's path could be modelled by the equation $h(t) = 2t^4 - 18t^3 + 28t^2 - 250 t + 250$, and the second by $h(t) = 19t^3 - 199t^2 + 298t - 182$, where h is their height above/below the water's surface in cm and t is the time during the first 8s of play. Over this 8 second period, at what times were the two orcas at the same height or depth?

$$2t^4 - 18t^3 + 28t^2 - 250t + 250 = 19t^3 - 199t^2 + 302t - 182$$