A) Using a definition of the derivative find the derivative of \( y = x^2 \) at \( x = a \)

\[
f'(a) = \lim_{{x \to a}} \frac{{x^2 - a^2}}{{x - a}} = \frac{{(x + a)(x - a)}}{{x - a}} = 2a
\]

B) Using a definition of the derivative find the derivative of \( y = x^3 \) at \( x = a \)

\[
f'(a) = \lim_{{x \to a}} \frac{{x^3 - a^3}}{{x - a}} = \frac{{(x - a)(x^2 + xa + a^2)}}{{x - a}} = 3a^2
\]

C) Using a definition of the derivative find the derivative of \( y = x^2 + 4 \) at \( x = a \)

\[
f'(a) = \lim_{{x \to a}} \frac{{x^2 + 4 - (a^2 + 4)}}{{x - a}} = \frac{{x^2 - a^2}}{{x - a}} = 2a
\]
Find the horizontal tangents of each curve:

1) \( x^3 + 2x^2 = 8 \)
   - \( \frac{dy}{dx} = 3x^2 + 4x \)
   - \( 0 = 3x^2 + 4x \)
   - \( x = 0 \)

2) \( \frac{2}{3}x^3 - \frac{5}{2}x^2 - 3x = 0 \)
   - \( \frac{dy}{dx} = 2x^2 - 5x - 3 \)
   - \( 0 = 2(x^2 - 5x - 3) \)
   - \( x = \frac{5}{2} \)
   - \( x = 3 \)