3.2 Dividing polynomial.
Long division.
Page 278.
#2. $\frac{x^3-x^2-2x+6}{x-2} = x^2 + x + \frac{6}{x-2}$

Synthetic division.
$P(x) = \frac{x^3-x^2-2x+6}{x-2} = x^2 + x + \frac{6}{x-2}$

Remainder theorem:
$P(x) = (x - 2)(x^2 + x) + 6$

Remainder theorem:
$P(x) = (x - c)Q(x) + R$
Then, $P(c) = R$

Factor Theorem.
c is a zero of $P$ if and only if $x - c$ is a factor of $P(x)$
$P(x) = (x - c)Q(x) + 0$

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#28. $P(x) = x^3 - x^2 + x + 5, c = -1$
From remainder Theorem, $R = P(c)$
and $R = P(-1) = (-1)^3 - (-1)^2 + (-1) + 5 = 2$
Use the Factor Theorem to show that $x - c$ is a factor of $P(x)$
for the given value(s) of $c$
#40. $P(x) = x^3 + 2x^2 - 3x - 10, x = 2$
$P(2) = 2^3 + 2 \cdot 2^2 - 3 \cdot 2 - 10 = 0$ if and only if
$x - 2$ is a factor of $P(x) = x^3 + 2x^2 - 3x - 10$