Practice Quiz A

1. Solve the following equation:

\[ x^2 = 8x - 12 \]

\[ x^2 - 8x + 12 = 0 \]

\[ (x-6)(x-2) = 0 \]

\[ x-6 = 0 \quad \text{or} \quad x-2 = 0 \]

\[ \boxed{x = 6} \quad \text{or} \quad \boxed{x = 2} \]

2. Solve the following equation:

\[ \frac{x}{x-1} - \frac{1}{x+3} = 0 \]

\[ \frac{(x+3)}{(x+3)} \cdot \frac{x}{x-1} - \frac{1}{x+3} \cdot \frac{(x-1)}{(x-1)} = 0 \]

\[ \frac{x(x+3)}{(x+3)(x-1)} - \frac{1}{x+3} \cdot \frac{(x-1)}{(x-1)} = 0 \]

\[ \frac{\chi^2 + 3\chi - \chi + 1}{(x+3)(x-1)} = 0 \]

\[ \frac{x^2 + 2x + 1}{(x+3)(x-1)} = 0 \]

\[ \chi^2 + 2\chi + 1 = 0 \]

\[ (x+1)(x+1) = 0 \]

\[ \boxed{x = -1} \]
3. Simplify (your answer should be a fraction in lowest terms):

\[
\frac{2}{x} - \frac{3}{x^2} - \frac{\frac{x}{x} \cdot \frac{2}{x} - \frac{3}{x^2}}{\frac{1}{x}} = \frac{2x - 3}{x^2} \cdot \frac{1}{x} = \frac{2x - 3}{x^3}
\]

4. Find the equation for the line through the points (3, -1) and (6, 8).

\[
m = \frac{8 - (-1)}{6 - 3} = \frac{9}{3} = 3
\]

\[
y = 3(x - 3) - 1
\]

or

\[
y = 3x - 10
\]
5. In 2000, the population of Red Hook was 1805, and in 2002, the population was 1824. Assuming that the population grows linearly, estimate the population of Red Hook in 2008.

\[
(2000, 1805) \\
(2002, 1824)
\]

\[
m = \frac{1824 - 1805}{2002 - 2000} = \frac{19}{2}
\]

\[
y = \frac{19}{2} (x - 2000) + 1805
\]

\[x = 2008\]

\[
y = \frac{19}{2} (2008 - 2000) + 1805
\]

\[
y = \frac{19}{2} (8) + 1805
\]

\[
y = 1881
\]
Practice Quiz B

1. Multiply the following out:

\[(x - 3)^3\]

\[(x - 3)(x - 3)(x - 3)\]

\[= (x^2 - 6x + 9)(x - 3)\]

\[= x^3 - 6x^2 + 9x - 3x^2 + 18x - 27\]

\[= x^3 - 9x^2 + 27x - 27\]

2. Simplify by adding the fractions. (Your answer should be a fraction in lowest terms.)

\[\frac{1}{x + 1} - \frac{3}{(x + 1)(x - 2)}\]

\[= \frac{(x - 2)}{(x - 2)} \cdot \frac{1}{x + 1} - \frac{3}{(x + 1)(x - 2)}\]

\[= \frac{x - 2 - 3}{(x - 2)(x + 1)} = \frac{x - 5}{(x - 2)(x + 1)}\]
3. Rationalize the denominator:

\[
\frac{y}{\sqrt{x} - \sqrt{y}} \cdot \frac{\sqrt{x} + \sqrt{y}}{\sqrt{x} + \sqrt{y}} = \frac{y\sqrt{x} + y\sqrt{y}}{x - y}
\]
4. Find the equation for the following line:

\[
\text{Slope } = \frac{1}{2} \\
\text{y-intercept: } y = 1
\]

\[
y = \frac{1}{2} x + 1
\]

5. At age 7, Megan has 18 friends. Starting at age 7, she gains 10 friends a year (and never loses any friends). How many friends does she have at age \(x\)?

\[
10(x-7) + 18
\]