Math 9 Lesson 3: Algebra and Equations

- Multi-step one-variable linear equations
- Includes distribution, variables on both sides of the equation, and collecting like terms
- Includes rational coefficients, constants, and solutions
- Solving and verifying $1 + 2x = 3 - \frac{2}{3}(x + 6)$
- Solving symbolically and pictorially

1. $2x = 8$

2. $12 = -3a$

3. $\frac{x}{3} = 5$

4. $7 = -\frac{a}{2}$

5. $\frac{2}{5} = \frac{\square}{15}$

6. $\frac{7}{\square} = \frac{14}{5}$

7. $2x(3 - 2) = 2$

8. $-2(3 - 5x) = 4$

9. $\frac{x}{2} = \frac{3}{5}$

10. $\frac{4}{9} = \frac{2}{x}$

11. $\frac{2}{x} = 5$

12. $-3 = \frac{5}{a}$

13. $2 - x = 3(x + 1)$

14. $-2(2x - 3) = 4 + x$

15. $\frac{2}{x+1} = \frac{3}{4}$

16. $\frac{2x-3}{5} = \frac{3}{-2}$

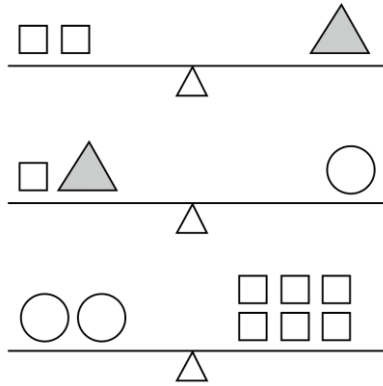17. $2 + \frac{1}{2} = \frac{1}{2-3x}$

18. $2x + \frac{x}{2} + 1 = 5$

19. $\frac{w}{3} - w + 2 = \frac{3}{2}$

20. $1 + 2x = 3 - \frac{2}{3}(x + 6)$

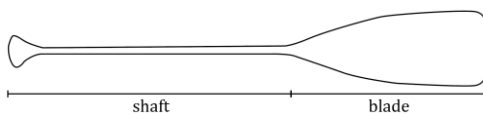21. $3x - 2 = \frac{2}{5}\left(\frac{3x}{2} - 1\right)$

22. Challenge:

a. If the weight one square is 2 kg. How heavy is the weight of a dozen circles?

b. $\left(\frac{2}{3}\right)^2 - \left(-\frac{x}{3}\right) \div \frac{2x}{5} - \frac{(-1)^0}{\sqrt{\frac{1}{121}}} = \frac{1}{\frac{1}{x}} - 0!$

c. $\frac{1+2x}{\frac{3}{2}} - 4\left(\frac{2}{3}\right)^2 \div \frac{-1^2}{\frac{x}{2}} = \frac{1+\frac{1}{2}}{\frac{2}{3}-2}$

d. See diagram below:

shaft   blade

Suppose the "blade" of a canoe paddle is $\frac{2}{5}$ of its total length.
The shaft portion of the paddle is 100 cm. What is the length of one paddle?

e. My dad was 31 when I was 8.
How old am I if my dad is double my age now?