Algebra Learning Trajectories

Solving linear equations in one unknown

1. In the following two problems, solve for the value of x.
   (a) $2x + 3 = x + 9$
   (b) $\frac{1}{2}(11 - x) = 5$
2. Solve for x
   (a) $\frac{1}{3}x - 7 = -4$
   (b) $\frac{3}{4}x = 9$
   (c) $\frac{1}{2}(x - 7) = 12$
   (d) $\frac{2}{3}(x + 7) = x - 4$
3. Solve for the value of x.
   (a) $3x - 3 = x + 7$
   (b) $\frac{1}{2}(4x + 2) = 7$
4. Solve for the value of x.
   (a) $\frac{4}{3}(6x - 3) = x + 10$
   (b) $\frac{2}{5}(x - 1) + \frac{5}{2}(1 - x) = 0$

Functions

5. Given the linear function $f(x) = 3x + 4$.
   (a) Find $f(0)$
   (b) $f(x) = 10$. Find x.
6. Given the linear function $f(x) = 2x - 6$.
   (a) $f(x) = 0$. Find x.
   (b) Find $f(2)$
7. Given the linear function $f(x) = -2x + 14$, find x.
   (a) Find $f(4)$
   (b) $f(x) = 21$. Find x.

Quadratics

8. Practice these techniques for quadratics (x^2)
   (a) Expand $(x + 4)(x + 3)$
   (b) Convert to *standard form* (equal to zero): $x^2 + 4 = 4x$
   (c) Factor, $x^2 + 9x + 8 = 0$
9. Given $x^2 + 9x + 8 = 0$. Factor and find the roots.
10. Given $x^2 + 8x + 7 = 0$. Factor and find the roots.

11. Given $x^2 + 6x + 5 = 0$. Factor and find the roots.
12. Solve for x, $x^2 + 10x + 7 = 2x$

Simplifying expressions

13. Perform each calculation, writing down the full calculator display and then rounding to the *nearest hundredth*.

    (a) $V = \frac{1}{3}\pi(2.4)^2(5.1)$ (b) $P = 3.6 + \frac{1}{2}\pi(3.6)$

14. Solve each equation for the appropriate variable. Do not round. Simplify radicals.

    (a) $A = \pi r^2 = 27\pi$ (b) $V = \frac{1}{3}(6.0)^2 h = 153$

15. Perform each calculation, writing down the full calculator display and then rounding to the *nearest hundredth*.

    (a) $V = \frac{1}{3}\pi(2.7)^2(1.1)$ (b) $W = 5.1 + \frac{1}{2}\pi(7.1)$

16. Solve each equation for the appropriate variable. Do not round. Simplify radicals.

    (a) $A = \pi r^2 = 18\pi$ (b) $V = \frac{1}{4}(2.2)^2 h = 12.1$

17. Perform each calculation, writing down the full calculator display and then rounding to the *nearest hundredth*.

    (a) $A = 15.944732$
    (b) $W = 3.4 \times 9.8 \times 4.3 \times 0.15$
    (c) $V = \frac{1}{3}\pi(3.4)^2(6.1)$
    (d) $P = 8.6 + \frac{1}{2}\pi(8.6)$
    (e) $V = 199.19711$
    (f) $W = \frac{1}{3}(13)3.3^2 \times 1.175$
    (g) $V = \frac{1}{3}\pi(12.4)^2(8.1)$
    (h) $P = 12 + \frac{1}{4}\pi(12)$

18. Perform each calculation, writing down the full calculator display and then rounding to the *nearest hundredth*.

    (a) $A = 15.944732$
    (b) $W = 3.4 \times 9.8 \times 4.3 \times 0.15$
    (c) $V = \frac{1}{3}\pi(3.4)^2(6.1)$
    (d) $P = 8.6 + \frac{1}{2}\pi(8.6)$
    (e) $V = 199.19711$
    (f) $W = \frac{1}{3}(13)3.3^2 \times 1.175$
    (g) $V = \frac{1}{3}\pi(12.4)^2(8.1)$
    (h) $P = 12 + \frac{1}{4}\pi(12)$

Trigonometric evaluation using calculator

19. Express the result to the nearest thousandth.

(a) $\sin 35° =$

(b) $\tan 70° =$

(c) $\sin 78° =$

(d) $\cos 12° =$