6A Equations review

1. **Evaluate the following equations.**

Equation	Solution
$6 + x = 15$	$x = 9$
$4 = x - 7$	$x = 11$
$5v + 3 = 23$	$v = 4$
$20 = p - 4$	$p = 24$
$12x = 36$	$x = 3$
$25 - x = x$	$x = 12.5$
$3u + 2 = 17$	$u = 5$
$9k = 81$	$k = 9$
$8 + a = 3a$	$a = 4$
$7 + y = 2y + 3$	$y = 4$
$2m + 5 = 13$	$m = 4$
$10z - 7 = 23$	$z = 3$
$3.3x + 4.9 = 21.1$	$x = 4.91$
$9x + 1.6 = 16$	$x = 1.6$
$12 = 1.5y$	$y = 8$
$5.2x + 8.9 = 55.2$	$x = 8.9$

2. **Use substitution to determine whether the given value of is the solution x to each equation**

Equation	Given x	Result
$2x + 3 = 11$	$x = 4$	True
$5x - 7 = 18$	$x = 5$	True
$3x + 5 = 20$	$x = 5$	True
$7x - 2 = 26$	$x = 4$	True
$\frac{x}{4} = 9$	$x = 36$	True
$\frac{3x}{2} = 12$	$x = 8$	True
$9x - 7 = 65$	$x = 8$	True
$10x - 5 = 45$	$x = 5$	True

6B Equivalent equations

1. **Evaluate the following equations.**

Equation	Solution
$10 - 3x = -19$	$x = \frac{29}{3}$
$10x + 8 = -22$	$x = -3$
$6x - 10 = -10$	$x = 0$
$9 + 3x = 24$	$x = 5$
$4x - 2 = -2$	$x = 0$
$3x - 1 = -10$	$x = -3$
$3x + 4 = -2$	$x = -2$
$9 + 4x = 25$	$x = 4$

2. **The following equations do not all have whole number solutions. Solve the following equations algebraically, giving each solution as a fraction.**

Equation	Solution
$7x + 4 = 18$	$x = 2$
$8 + 10x = -108$	$x = -\frac{58}{5}$
$6 + 3x = -21$	$x = -9$
$1 - x = -3$	$x = 4$
$5x - 10 = -40$	$x = -6$
$10x + 10 = -90$	$x = -10$
$7 + 7x = -28$	$x = -5$
$6 + 3x = -3$	$x = -3$

3. **Solve the following equations algebraically. More than two steps are involved.**

Equation	Solution
$5(5x + 9) = 220$	$x = 7$
$5 = \frac{9x - 1}{9} + 9$	$x = \frac{46}{9}$
$6(2x + 10) = 180$	$x = 10$

6C Equations with fractions

1. Solve the following equations algebraically.

Equation	Solution
$9 - \frac{10x}{7} = -7$	$x = \frac{56}{5}$
$1 + \frac{6x}{2} = 8$	$x = \frac{7}{3}$
$4 - \frac{5x}{5} = 10$	$x = -6$
$\frac{5c}{2} + 7 = 10$	$c = \frac{6}{5}$
$\frac{3x}{5} + 2 = 7$	$x = \frac{25}{3}$
$\frac{7x}{4} + 3 = 10$	$x = \frac{28}{7} = 4$

2. Solve the following equations algebraically.

Equation	Solution
$\frac{y+5}{3} = 7$	$y = 16$
$\frac{m-4}{6} = -3$	$m = -14$
$\frac{2k+9}{4} = 1$	$k = -\frac{5}{2}$
$\frac{p-2}{5} = -4$	$p = -18$
$\frac{q-6}{3} = 2$	$q = 12$
$\frac{r+8}{4} = -1$	$r = -12$
$\frac{3s-5}{2} = 7$	$s = \frac{19}{3}$
$\frac{t+9}{5} = 3$	$t = 6$
$\frac{u-4}{6} = -2$	$u = -8$
$\frac{y+11}{3} = 5$	$y = 4$
$\frac{2w-7}{4} = 6$	$w = \frac{31}{2}$
$\frac{x+14}{7} = -3$	$x = -35$
$\frac{4b+9}{5} = 3$	$b = \frac{3}{2}$
$\frac{6d-8}{3} = 4$	$d = 3$
$\frac{7e+14}{2} = 11$	$e = \frac{1}{7}$
$\frac{8f-12}{4} = 2$	$f = 2$

6D Equations with pronumerals on both sides

1. Solve the following equations algebraically.

Equation	Solution
$15 - 7m = 6 - 9m$	$m = -\frac{9}{2}$
$5 + 4n = 17 - 3n$	$n = \frac{12}{7}$
$28 - 2p = 7 + 6p$	$p = \frac{21}{8}$
$10 + 5q = 35 + 4q$	$q = 25$
$12r - 8 = 6r + 4$	$r = 2$
$9 + 3s = 2 - 7s$	$s = -\frac{7}{10}$
$7 + 2t = 4 - 8t$	$t = -\frac{3}{10}$
$18 - 6u = 3 + 4u$	$u = \frac{3}{2}$
$11v + 5 = 22 - 2v$	$v = \frac{17}{13}$
$16 + 4w = 10 - 3w$	$w = -\frac{6}{7}$
$20x - 3 = 5x + 7$	$x = \frac{2}{3}$
$9y + 8 = 17 - 4y$	$y = \frac{9}{13}$
$50 - 8m = 14m + 30$	$m = \frac{10}{11}$
$12 + 9y = 5y + 52$	$y = 10$
$70 - 7z = 2z + 23$	$z = \frac{47}{9}$
$45 + 5a = 3a + 81$	$a = 18$
$36 + 4b = 2b + 70$	$b = 17$
$90 - 6c = 3c + 45$	$c = 5$
$100 - 5x = 2x + 85$	$x = \frac{15}{7}$
$150 + 6y = 3y + 198$	$y = 16$
$80 - 4z = 2z + 56$	$z = 4$

6E Equations with brackets

1. Solve the Following Equations Algebraically

Equation	Solution
$3(2x - 1) = 4x + 5$	$x = 4$
$5(y + 3) = 2y + 21$	$y = 2$
$2(z - 4) = 3z + 6$	$z = -14$
$4(a - 2) + 3 = 2a + 9$	$a = 7$
$3(b + 5) - 4 = b + 14$	$b = \frac{3}{2}$
$6(c - 1) + 2 = 4c + 8$	$c = 6$
$4(2x - 3) + 5 = 3x + 7$	$x = \frac{14}{5}$
$5(3y + 2) - 4 = 2y + 9 + y$	$y = \frac{1}{4}$
$2(4z - 5) + 3(z + 7) = 6z - 8$	$z = -\frac{19}{5}$
$3(2a + 4) - 5(a - 2) = 2(a + 6) + 3$	$a = 7$
$4(b + 5) - 3(2b - 1) = 7(b - 2) + 10$	$b = 3$
$2(3c - 4) + 4(2c + 5) = 5c - 3 + 6c$	$c = -5$

2. Solve the Following Equations Algebraically

Equation	Solution
$2(4 + 2a) + 5 = 3(2a + 5) + 7$	$a = -\frac{9}{2}$
$3(2b - 1) + 8 = 2(2b + 4) - 6$	$b = -\frac{3}{2}$
$4(3c + 2) - 3 = 5(2c + 1) + 7$	$c = \frac{7}{2}$
$5(2d - 3) + 4 = 3(4d + 2) - 5$	$d = -6$
$3(3e + 4) - 2 = 4(2e + 3) + 6$	$e = 8$
$2(5f - 3) + 7 = 3(3f + 2) - 4$	$f = 1$
$4(2g + 5) - 6 = 3(3g + 4) + 5$	$g = -3$
$5(3h - 2) + 8 = 2(4h + 5) - 3$	$h = \frac{9}{7}$
$3(4i + 3) - 7 = 2(5i + 2) + 6$	$i = 4$
$2(6j - 1) + 5 = 3(2j + 3) - 2$	$j = \frac{2}{3}$

6F Formulas and relationships

1.

- Part a: $b = 5$

- Part b: $b = 8$

- Part c: $b = -3$

2.

- Part a: $c = 3$

- Part b: $c = 6$

- Part c: $c = -1$

6G Applications

1.

- **Part a:** h represents the length of the visit in hours.

- **Part b:** The equation is $305 = 80 + 45h$.

- **Part c:** The length of the visit is $h = 5$ hours.

- **Part d:** The length of the visit in minutes is 300 minutes.

2.

- **Part b:** The length of the garden $L = \frac{37}{3}$ meters.

- **Part c:** The area of the garden is $\frac{2405}{9}$ square meters or approximately 267.22 square meters.

6H Inequalities

1.

1. $x > 5$:
   - Number line: open circle at 5 and shading to the right.
   -

2. $x < 7$:
   - Number line: open circle at 7 and shading to the left.
   -

3. $x \geq 10$:
   - Number line: closed circle at 10 and shading to the right.
   -

4. $x \leq 24$:
   - Number line: closed circle at 24 and shading to the left.
   -

5. $x < -7$:
   - Number line: open circle at -7 and shading to the left.
   -

6. $x > -11$:
   - Number line: open circle at -11 and shading to the right.
   -

7. $x \leq -21$:
   - Number line: closed circle at -21 and shading to the left.
   -

8. $x \geq -14$:
   - Number line: closed circle at -14 and shading to the right.
   -

9. $1 < x \leq 5$:

   - Number line: open circle at 1 and closed circle at 5, shading in between.

   -

10. $3 \leq x \leq 6$:

    - Number line: closed circles at 3 and 6, shading in between.

    -

11. $8 \leq x < 11$:

    - Number line: closed circle at 8 and open circle at 11, shading in between.

    -

12. $0 < x < 3$:

    - Number line: open circles at 0 and 3, shading in between.

    -

13. $2.5 \leq x < 3.5$:

    - Number line: closed circle at 2.5 and open circle at 3.5, shading in between.

    -

14. $8.5 < x \leq 9$:

    - Number line: open circle at 8.5 and closed circle at 9, shading in between.

    -

15. $-3 < x < 0$:

6I Solving inequalities

1.

Inequality	Solution
$3x + 4 > 19$	$x > 5$
$5m - 7 \geq 28$	$m \geq 7$
$6n + 2 \leq 20$	$n \leq 3$
$7p - 5 < 35$	$p < \frac{40}{7}$
$2q + 9 \geq 17$	$q \geq 4$
$4r - 3 \leq 25$	$r \leq 7$
$5s + 8 > 33$	$s > 5$
$3t - 4 < 14$	$t < 6$
$9u + 1 \geq 10$	$u \geq 1$
$2v - 6 \leq 16$	$v \leq 11$
$8w + 7 > 39$	$w > 4$
$10x - 5 < 45$	$x < 5$
$\frac{b-7}{3} < 4$	$b < 19$
$\frac{c+5}{2} \leq 9$	$c \leq 13$
$\frac{c+3}{5} \geq 2$	$c \geq 7$
$\frac{d-6}{4} > 3$	$d > 18$
$\frac{f-8}{3} > 5$	$f > 23$
$\frac{g+6}{2} \leq 7$	$g \leq 8$
$\frac{h-4}{3} \geq 6$	$h \geq 22$
$\frac{k+2}{4} < 5$	$k < 18$
$\frac{2b-5}{3} \leq 7$	$b \leq 13$
$\frac{3c+4}{2} > 6$	$c > \frac{8}{3}$
$\frac{4d-9}{5} \geq 3$	$d \geq 6$
$\frac{5c+2}{4} < 9$	$c < \frac{34}{5}$

2.

Inequality	Solution
$30 - 5x \leq 10$	$x \geq 4$
$15 - 3y > -5$	$y < \frac{20}{3}$
$25 - 4z \geq -15$	$z \leq 10$
$50 - 2w < 0$	$w > 25$
$12 - 3x > 21$	$x < -3$
$8 - 2y \leq 4$	$y \geq 2$
$20 - 5z \geq 5$	$z \leq 3$
$18 - 4w < -2$	$w > 5$
$16 - 3t \geq 1$	$t \leq 5$
$22 - 6u < 10$	$u > 2$
$14 - 7v > -7$	$v < 3$
$10 - 2p \leq 6$	$p \geq 2$
$28 - 5q \geq 3$	$q \leq 5$
$24 - 4r < 8$	$r > 4$
$32 - 4s > 12$	$s < 5$
$-3(2x - 5) \geq 9$	$x \leq 1$
$-2(4w + 6) > 16$	$w < -\frac{7}{2}$
$-5(3p - 2) \leq 10$	$p \geq 0$