Recap Mixed Numbers

1) $4\frac{3}{4} + 1\frac{2}{3}$

$= 5\frac{9+8}{12}$

$= 5\frac{17}{12}$

$= 6\frac{5}{12}$

2) $7\frac{1}{5} - 2\frac{2}{7}$

$= 4\frac{\overset{35+}{\cancel{8}}\ 7-10}{35}$

$= 4\frac{32}{35}$

3) $3\frac{3}{4} \times 1\frac{4}{5}$

$= \frac{\overset{3}{\cancel{15}}}{4} \times \frac{9}{\cancel{5}_1}$

$= \frac{27}{4}$

$= 6\frac{3}{4}$

4) $6\frac{1}{4} \div 2\frac{1}{7}$

$= \frac{25}{4} \div \frac{15}{7}$

$= \frac{\overset{5}{\cancel{25}}}{4} \times \frac{7}{\cancel{15}_3}$

$= \frac{35}{12}$

$= 2\frac{11}{12}$

Substitution into Formulae

Physics (Mechanics) Formulae

$v = u + at$

$s = ut + \frac{1}{2}at^2$

$v^2 = u^2 + 2as$

u = initial velocity

v = final velocity

a = constant acceleration

t = time

s = distance

Ex 1 Find v, when $u = 0$, $a = 9.81$, $t = 2$

$$v = 0 + 9.81 \times 2$$
$$v = 19.62$$

Ex 2 Find s when $u = 0$, $a = 9.81$, $t = 2$

$$s = 0 \times 2 + \frac{1}{2} \times 9.81 \times 2^2$$
$$s = 19.62$$

Ex 3 Find v when $u = 4$, $a = 5$, $s = 60$

$$v^2 = 4^2 + 2 \times 5 \times 60$$
$$v^2 = 616$$
$$v = \sqrt{616}$$
$$v = 24.8$$

Exercise

1) $u = 7$, $a = 4$, $t = 5$ Find v

$$v = 7 + 4 \times 5$$
$$v = 27$$

2) $u = 7$, $a = 4$, $t = 5$ Find s

$$s = 7 \times 5 + \frac{1}{2} \times 4 \times 5^2$$
$$s = 85$$

3) $u = 5$, $a = 3$, $s = 68$ Find v

$$v^2 = 5^2 + 2 \times 3 \times 68 = 433$$
$$v = \sqrt{433} = 20.8$$

Quadratic Formula to solve $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Ex Solve $\underset{a}{2}x^2 + \underset{b}{9}x + \underset{c}{3} = 0$

$$x = \frac{-9 \pm \sqrt{9^2 - 4(2)(3)}}{2(2)}$$

$$x = \frac{-9 \pm \sqrt{81 - 24}}{4}$$

$$x = \frac{-9 + \sqrt{57}}{4} \quad \text{or} \quad x = \frac{-9 - \sqrt{57}}{4}$$

$$x = -0.363 \qquad x = -4.14$$

Ex Solve $4x^2 - 5x - 3 = 0$

$a = 4$
$b = -5$
$c = -3$

$$x = \frac{+5 \pm \sqrt{(-5)^2 - 4(4)(-3)}}{2(4)}$$

$$x = \frac{+5 \pm \sqrt{25 + 48}}{8}$$

$$x = \frac{+5 + \sqrt{73}}{8} \quad \text{or} \quad x = \frac{+5 - \sqrt{73}}{8}$$

$$x = 1.69 \qquad x = -0.443$$

Exercise Solve $2x^2 - 8x + 7 = 0$

$a = 2$
$b = -8$
$c = 7$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(2)(7)}}{2(2)}$$

$$x = \frac{8 \pm \sqrt{64 - 56}}{4}$$

$$x = \frac{8 + \sqrt{8}}{4} \quad \text{or} \quad x = \frac{8 - \sqrt{8}}{4}$$

$$\underline{x = 2.71} \qquad \underline{x = 1.29}$$