

Problem Set 1

1. $90 - A = \text{complement of angle } A$

$$(1) \quad 180 - A = \text{supplement of angle } A$$

$$5(90 - A) = 150 + (180 - A)$$

$$450 - 5A = 330 - A$$

$$4A = 120$$

$$A = 30^\circ$$

2. $90 - B = \text{complement of angle } B$

$$(1) \quad 180 - B = \text{supplement of angle } B$$

$$7(90 - B) = 2(180 - B) + 220$$

$$630 - 7B = 360 - 2B + 220$$

$$5B = 50$$

$$B = 10^\circ$$

3. $90 - A = \text{complement of angle } A$

(1)

$$4(90 - A) = 200$$

$$360 - 4A = 200$$

$$4A = 160$$

$$A = 40^\circ$$

4. If 20% fused, then 80% did not fuse.

(R)

$$0.80T = 1420$$

$$T = 1775 \text{ grams}$$

5. Pusillanimous brave men = p

(R)

$$\text{Oxymorons} = x$$

$$\frac{x}{x + p} = \frac{2}{2 + 17}$$

$$\frac{x}{342} = \frac{2}{19}$$

$$19x = 684$$

$$x = 36$$

$$6. \quad \frac{2^{-3}x^0(x^2)}{x^{-3}xy^{-3}y} = \frac{(1)x^2x^3y^3}{2^3xy} = \frac{x^5y^3}{8xy} = \frac{x^4y^2}{8}$$

$$7. \quad -(-3 - 2) + 4(-2) + \frac{1}{-2^{-3}} - (-2)^{-3}$$

$$= -(-5) + (-8) + (-2^3) - \frac{1}{(-2)^3}$$

$$= 5 - 8 + (-8) - \frac{1}{-8}$$

$$= -11 + \frac{1}{8} = -\frac{88}{8} + \frac{1}{8} = -\frac{87}{8}$$

$$8. \quad \frac{xy}{y^{-2}} - \frac{3x^4y^4}{x^3y} + \frac{7xy^{-2}}{xy^{-3}} = xy^2 - 3xy^3 + \frac{7y^3}{y^2}$$

$$= xy^3 - 3xy^3 + 7y = 7y - 2xy^3$$

$$9. \quad \frac{x^0y^{-2}x}{x^3y} \left(\frac{x^2y}{m} - \frac{3x^4y^2}{m^{-2}} \right)$$

$$= \frac{1}{x^2y^3} \left(\frac{x^2y}{m} - 3x^4m^2y^2 \right)$$

$$= \frac{1}{y^2m} - \frac{3x^2m^2}{y}$$

$$10. \quad 3^0(2x - 5) + (-x - 5) = -3(x^0 - 2)$$

(R)

$$1(2x - 5) + (-x - 5) = -3(1 - 2)$$

$$2x - 5 - x - 5 = 3$$

$$x = 13$$

$$11. \quad xy - x(x - y^0) = 2\left(-\frac{1}{2}\right) - 2(2 - 1) = -3$$

(R)

$$12. \quad \frac{2}{x} + \frac{x}{x + 1} = \frac{2(x + 1) + x(x)}{x(x + 1)}$$

$$= \frac{x^2 + 2x + 2}{x^2 + x}$$

$$13. \quad (2x + 3)(2x^2 + 2x + 2)$$

$$(R) \quad = 2x(2x^2 + 2x + 2) + 3(2x^2 + 2x + 2)$$

$$= 4x^3 + 4x^2 + 4x + 6x^2 + 6x + 6$$

$$= 4x^3 + 10x^2 + 10x + 6$$

14. Multiply the first equation by -5 and add to the second equation. Then solve for N_D .

(R)

$$-5N_N - 5N_D = -250$$

$$5N_N + 10N_D = 450$$

$$5N_D = 200$$

$$N_D = 40$$

Now substitute this back into the second equation.

$$5N_N + 10N_D = 450$$

$$5N_N + 10(40) = 450$$

$$5N_N = 50$$

$$N_N = 10$$