3 Algebraic Fractions and Formulas

This exercise covers the following Basic Competency Descriptors for new KS3 curriculum.

NA13-1	Perform operations of two algebraic fractions, both the numerators and denominators being monomials, such as $\frac{1}{x}$, $\frac{3x}{2y}$, etc.
NA13-2	Substitute values into formulae (in which all exponents are positive integers) and find the value of a specified variable.
NA13-3	Perform change of subject in simple formulae not involving radical sign.

Section A: Write your answers in the spaces provided. Working need not be shown.

NA13-1

1. Simplify $\frac{8m}{n} \times \frac{1}{4m}$.

Answer: _____

NA13-1

2. Simplify $\frac{3}{5k} \times \frac{k}{6t}$.

Answer: _____

NA13-1

3. Simplify $\left(\frac{4}{3e}\right)\left(\frac{3}{4e}\right)$.

Answer: _____

NA13-1

4. Simplify $\left(\frac{x^2}{3y}\right)\left(\frac{y^2}{x^3}\right)$.

Answer: _____

NA13-1

5. Simplify $\frac{u}{5} + \frac{u}{20}$.

Answer: _____

NA13-1

6. Simplify $\frac{3}{y}-\frac{1}{3y}$.

Answer: _____

NA13-1

7. Simplify $\frac{1}{6w}-\frac{1}{8w}$.

Answer: _____

NA13-1

8. Simplify $\frac{y}{4x}+\frac{2y}{x}$.

Answer: _____

NA13-1

9. Simplify $\frac{7y}{3x}-\frac{2xy}{x^2}$

Answer: _____

NA13-2

10. Consider the formula $v=\frac{2a+3}{u+1}$. If $a=6$ and $u=4$, find the value of v.

Answer: _____

NA13-2

11. Consider the formula $u=\frac{v^2}{3+w}$. If $w=-4$ and $v=2$, find the value of u.

Answer: _____

NA13-2

12. Consider the formula $s=ut+\frac{1}{2}at^2$. If $u=-2$, $t=3$ and $a=10$, find the value of s.

Answer: _____

NA13-2

13. Consider the formula $\frac{x}{5}-\frac{4}{y}=\frac{z}{6}$. If $y=2$ and $z=30$, find the value of x.

Answer: _____

NA13-2

14. Consider the formula $(3z)^2 = \frac{y^3}{x}$. If $z = -1$ and $y = 6$, find the value of x.

Answer: _____

NA13-2

15. A scientific formula is given as follows:

$$K = \frac{Iw^2}{2}$$

If $K = 36$ and $w = 3$, find the value of I.

Answer: _____

NA13-2

16. A scientific formula is given as follows:

$$W = \frac{V^2}{R} \times T$$

If $W = 60$, $V = 8$ and $R = 6.4$, find the value of T.

Answer: _____

NA13-2

17. The cost ($\$C$) of producing TV game sets by a company can be calculated by the following formula:

$$C = 200n + \frac{72\,000}{n^2},$$

where n is the number of TV game sets produced. If $n = 60$, find the value of C.

Answer: $C =$ _____

NA13-2

18. The profit ($\$P$) made by Harry on selling books can be calculated by the following formula:

$$P = 10 + 35x,$$

where x is the number of books sold. If the profit was \$3860, find the number of books sold.

Answer: The number of books sold was _____.

NA13-3

19. Make x the subject of the formula $y = 5x + 2$.

Answer: _____

NA13-3

20. Make Q the subject of the formula $P = 7 - 3Q$.

Answer: _____

NA13-3

21. Make x the subject of the formula $y=\frac{x-2}{4}$.

Answer: _____

NA13-3

22. Make x the subject of the formula $y=\frac{2}{x}-3$.

Answer: _____

NA13-3

23. Make e the subject of the formula $d=\frac{e+3}{e-1}$.

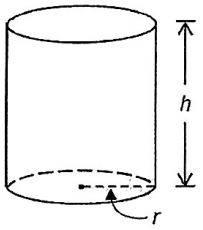
Answer: _____

Section B: Answer in the spaces provided. All working and conclusions must be clearly shown.

24. In the figure, the total surface area S of the cylinder can be calculated by the following formula:

$S=2\pi r(h+r)$,

where r and h represent the base radius and the height of the cylinder respectively.



NA13-3

(a) Make h the subject of the formula.

NA13-2

(b) If $r=6$ and $S=216\pi$, find the value of h.

25. The cost ($\$C$) of making a suit can be calculated by the following formula:

$$C=2(m-10)+3\ell,$$

where $\$m$ and $\$\ell$ are the material cost and the labour cost respectively.

NA13-3

(a) Make m the subject of the formula.

NA13-2

(b) If $C=158$ and $\ell=40$, find the value of m.