FORMULAE (ADVANCED)

[ESTIMATED TIME: 70 minutes]

GCSE

(+ IGCSE) EXAM QUESTION PRACTICE

1. **[2 marks]**

Make r the subject of the formula $A = 4\pi r^2$ where r is positive.

$r =$.....

2. **[2 marks]**

Make a the subject of $P = \sqrt{ab}$

$a =$ .....

3. **[2 marks]**

Make W the subject of the formula $h = \sqrt{\frac{W}{I}}$

$W =$ .....

4. **[2 marks]**

The formula for the curved surface area, A, of a cylinder is

$$A = 2\pi rh$$

where r is the radius and h is the height.

Calculate the value of r when $A = 19.8$ and $h = 2.1$
Give your answer correct to one decimal place.

$A =$ .....

5. **[3 marks]**

Make x the subject of $3x - y = x + 7$

$x =$ .....

6. **[2 marks]**

Make h the subject of the formula $A = 2\pi r(r + h)$

$h =$ .....

7. **[3 marks]**

Make y the subject of $3(y + 2x - 1) = x + 5y$

$y =$ .....

8. **[3 marks]**

Make t the subject of $5(t - g) = 2t + 7$

.....

9. **[4 marks]**

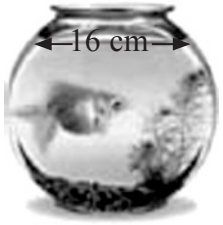

Diagram **NOT** accurately drawn

The diagram shows a fish bowl.
The water surface is a circle with a diameter of 16 cm.

(a) Work out the area of a circle with a diameter of 16 cm.
Give your answer correct to 3 significant figures.

..... cm^2
(2)

(b) The volume of water, V cm^3, in the fish bowl may be found using the formula

$$V = \frac{1}{6}\pi h(3x^2 + 3y^2 + h^2)$$

Find the value of V when $h = 16.4$
$x = 6.5$
and $y = 8$

Give your answer correct to 3 significant figures.

$V =$ .....
(2)

10. **[4 marks]**

$I = kT^4$

$k = 5.67 \times 10^{-8}$

$T = 5800$

(a) Work out the value of I.
Give your answer in standard form correct to 3 significant figures.

$I =$ .....

(2)

(b) Rearrange the formula $I = kT^4$ to make T the subject.

.....

(2)

11. **[3 marks]**

Make v the subject of the formula $m(v - u) = I$

$v =$ .....

12. **[3 marks]**

Make r the subject of the formula $A = 4r^2 - \pi r^2$ where r is positive.

$r =$ .....

13. **[5 marks]**

Given that y is positive, make y the subject of $y = \sqrt{ay^2 + n}$

Show clear algebraic working.

$y =$ .....

14. **[4 marks]**

Make n the subject of the formula

$$t = \sqrt{\frac{n+3}{n}}$$

$n =$ .....

15. **[4 marks]**

Make x the subject of $y = \sqrt{\frac{2x+1}{x-1}}$

.....

16. **[7 marks]**

$$T = \frac{n(1+e)}{(1-e)}$$

(a) Work out the value of T when $n = 8.6$ and $e = 0.2$

$T =$ .....

(2)

(b) Make e the subject of the formula $T = \frac{n(1+e)}{(1-e)}$

$e =$ .....

(5)

17. **[4 marks]**

Make t the subject of the formula $m = \dfrac{t+1}{t-3}$

.....

18. **[3 marks]**

Make g the subject of $3e + 4g = 7 + 9eg$

19. **[4 marks]**

Make x the subject of $P = \dfrac{100\,(y - x)}{x}$

x = ...

20. **[4 marks]**

Make R the subject of the formula $A = \pi(R + r)(R - r)$

R = ...

21. **[4 marks]**

$y = at^2 - 2at$

$x = 2a\sqrt{t}$

Express y in terms of x and a.

Give your answer in the form

$$y = \frac{x^p}{ma^3} - \frac{x^q}{na}$$

where p, q, m and n are integers.

.....

22. **[5 marks]**

Make y the subject of $\frac{y}{x} + \frac{2y}{x+4} = 3$

Show your working clearly and give your answer as simply as possible.

$y =$.....