A Level Maths & Further Maths

Bridging Pack

Practice Test

50 minutes

Advice to all students

Practice under timed conditions

Do not spend lots of time on any one question

Answer all questions

Show all working out

Marks for each question are indicated in brackets

Calculators are NOT allowed.

Total marks available = 74

1. Simplify these expressions fully

a) $2y^2(3-x)-5x(1-3y^2)+7y^2$ (1)

b) $(x+1)(x-2)^2$ (3)

c) $\frac{64a^5b^2}{16a^2b^7}$ (2)

d) $\frac{9x^{\frac{1}{2}}}{(27x^{-2})^{\frac{2}{3}}}$ (3)

2. Factorise these expressions fully

a) $9p^4 - 6p^4q^2$ (2)

b) $16p^2 - 25$ (2)

c) $x^2 - x - 6$ (2)

d) $3x^2 - 8x - 3$ (2)

3. Find the value of

a) $64^{\frac{1}{2}}$ (1)

b) $32^{-\frac{3}{5}}$ (2)

c) $\left(2\frac{10}{27}\right)^{\frac{1}{3}}$ (2)

4. Simplify fully

a) $\frac{\sqrt{80}}{2}$ (2)

b) $(2+5\sqrt{3})(3-2\sqrt{3})$ (3)

5. Rationalise the denominators and simplify fully

(a) $\dfrac{12}{\sqrt{3}}$ **(2)**

(b) $\dfrac{6}{\sqrt{3}-2}$ **(3)**

(c) $\dfrac{\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}}$ **(4)**

6. a) Solve the following $x^2 + 2x - 15 = 0$ (3)

b) Solve the following equations giving your solutions in surd form

(i) $x^2 + 3x + 1 = 0$ (3)

(ii) $2x^2 - 3x = 1$ (3)

7. The three sides of a right-angled triangle are x, x + 1 and 5.

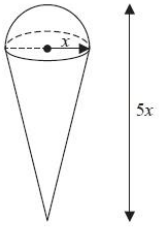
Given that the longest side is 5, find the value of x and the area of the triangle. (4)

8. a) Solve $\frac{x+1}{3} + \frac{2x+5}{4} = 2$ (4)

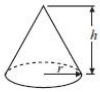
b) Make *m* the subject of the formula $f = \frac{3m+4}{m-1}$ (3)

9. A solid is made by putting a hemisphere on top of a cone.

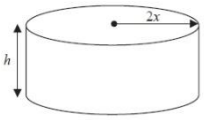
The total height of the solid is $5x$
The radius of the base of the cone is x
The radius of the hemisphere is x



Volume of cone $= \frac{1}{3}\pi r^2 h$



Volume of sphere $= \frac{4}{3}\pi r^3$



A cylinder has the same volume as the solid.
The cylinder has radius $2x$ and height h
All measurements are in centimetres.

Find a formula for h in terms of x
Give your answer in its simplest form. (5)

10. The expression $x^2 + 2x - 4$ can be written in the form $(x + p)^2 + q$, for all values of *x*.

(i) Find the value of *p* and the value of *q*. (3)

(ii) Hence find the solution to $x^2 + 2x - 4 = 0$, giving your answer in the form $x = a \pm \sqrt{5}$ (2)

11. Solve the simultaneous equations:

(a) $2x + 3y = 5$
$5x - 2y = -16$ **(3)**

(b) $x - 2y = 1$
$4y^2 - 3x^2 = 1$ **(5)**

End of Test