Functions - Lesson 3

Functions - Surds, Powers and Missing Inputs

LI

- Work out more complicated functions.
- Work out missing inputs.

SC

- Surds.
- Indices.
- Solve simple equations.

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Example 1

If $f(x) = \sqrt{x}$ calculate :

(a) $f(12)$.

(b) $f(72)$.

(a) $f(x) = \sqrt{x}$

$\therefore$ $f(12) = \sqrt{12}$

$\Rightarrow$ $f(12) = \sqrt{4}\,\sqrt{3}$

$\Rightarrow$ $\boxed{f(12) = 2\sqrt{3}}$

(b) $f(x) = \sqrt{x}$

$\therefore$ $f(72) = \sqrt{72}$

$\Rightarrow$ $f(72) = \sqrt{36}\,\sqrt{2}$

$\Rightarrow$ $\boxed{f(72) = 6\sqrt{2}}$

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<u>Example 2</u>

If $g(x) = 4^x$ calculate :

(a) $g(1/2)$.

(b) $g(-1/2)$.

(c) $g(3/2)$.

(a) $\qquad g(x) = 4^x$

$\therefore \quad g(1/2) = 4^{1/2}$

$\Rightarrow \quad g(1/2) = \sqrt{4}$

$\Rightarrow \quad \boxed{g(1/2) = 2}$

(b) $\qquad g(x) = 4^x$

$\therefore \quad g(-1/2) = 4^{-1/2}$

$\Rightarrow \quad g(-1/2) = \dfrac{1}{4^{1/2}}$

$\Rightarrow \quad \boxed{g(-1/2) = \dfrac{1}{2}}$

(c) $\qquad g(x) = 4^x$

$\therefore \quad g(3/2) = 4^{3/2}$

$\Rightarrow \quad g(3/2) = (4^{1/2})^3$

$\Rightarrow \quad g(3/2) = 2^3$

$\Rightarrow \quad \boxed{g(3/2) = 8}$

Example 3

If $r(x) = 4x + 7$, find the value of x so that $r(x) = 23$.

$$r(x) = 4x + 7, \; r(x) = 23$$

$$\therefore \qquad 4x + 7 = 23$$

$$\Rightarrow \qquad 4x = 16$$

$$\Rightarrow \qquad \boxed{x = 4}$$

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<u>Example 4</u>

If $p(x) = 3x - 2$, find the value of b so that $p(b) = 12$.

$$p(x) = 3x - 2$$

$$\therefore \qquad p(b) = 3b - 2$$

$$\Rightarrow \qquad 3b - 2 = 12$$

$$\Rightarrow \qquad 3b = 14$$

$$\Rightarrow \qquad \boxed{b = 14/3}$$

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Questions

1) If $f(x) = \sqrt{x}$ calculate : $f(8), f(20), f(27), f(125)$.

2) If $g(x) = 9^x$ calculate : $g(1/2), g(-1/2), g(3/2)$.

3) If $p(x) = 2x + 9$, find the value of x if $p(x) = 17$.

4) If $r(x) = 7x + 30$, find the value of x if $r(x) = 79$.

5) If $T(x) = 5x - 9$, find the value of b if $T(b) = 21$.

6) If $N(x) = 6x - 15$, find the value of p if $N(p) = 27$.

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Answers

1) If $f(x) = \sqrt{x}$ calculate : $f(8), f(20), f(27), f(125)$.
$$2\sqrt{2} \quad 4\sqrt{2} \quad 3\sqrt{3} \quad 5\sqrt{5}$$

2) If $g(x) = 9^x$ calculate : $g(1/2), g(-1/2), g(3/2)$.
$$3 \qquad 1/3 \qquad 27$$

3) If $p(x) = 2x + 9$, find the value of x if $p(x) = 17$.
$$x = 4$$

4) If $r(x) = 7x + 30$, find the value of x if $r(x) = 79$.
$$x = 7$$

5) If $T(x) = 5x - 9$, find the value of b if $T(b) = 21$.
$$b = 6$$

6) If $N(x) = 6x - 15$, find the value of p if $N(p) = 27$.
$$p = 43/6$$

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