KING SAUD UNIVERSITY
DEANSHIP OF COMMON FIRST YEAR
BASIC SCIENCES DEPARTMENT

MATH 101 HW # 1 / FIRST SEMESTER 1439-1440 Date: 20/09/2018

Question 1 **2 Marks for each**

A. Classify the following numbers into rational and irrational

$$\left\{\sqrt{2},\ \sqrt{25},\ \sqrt{144},\ 2.7\overline{6},\ \frac{3\pi}{2},\ 0,9\right\}.$$

B. Solve the following inequalities.

1. $4-2\left|\frac{5-2x}{2}\right| \le -8$
2. $0 < |2x-3| < 6$
3. $x^3 - 3x^2 \le 4x$
4. $\left|\frac{x}{x-5}\right| > 0$
5. $\frac{3}{x-2} < \frac{5}{x-6}$
6. $\frac{1-x}{\sqrt{x^2-3}} \ge 0$
7. $x+3 < 2x-5 \le x+7$

Q1-A

$\sqrt{2}$	$\sqrt{25}$	$\sqrt{144}$
$2.7\overline{6}$	$\frac{3\pi}{2}$	0.9

Q1 - B1 $4-2\left|\frac{5-2x}{2}\right| \le -8$

Q1 – B2 $0 < |2x - 3| < 6$

Q1 – B3 $x^3 - 3x^2 \leq 4x$

Q1 – B4 $\left|\frac{x}{x-5}\right| > 0$

Q1 – B5 $\frac{3}{x-2} < \frac{5}{x-6}$

Q1 – B6 $\frac{1-x}{\sqrt{x^2-3}} \geq 0$

Q1 – B7 $x + 3 < 2x - 5 \leq x + 7$

Question 2 — **2 Marks for each**

Find the domain of the following functions

1. $f(x) = \dfrac{3x^2 + 1}{\sqrt{x^2 + 10x + 25}}$

2. $f(x) = \dfrac{1 + x}{\sqrt{2x - 3} - 3}$

3. $f(x) = \dfrac{1 - 2x}{x^2 + 16}$

Q2 – 1 $\boldsymbol{f(x) = \frac{3x^2+1}{\sqrt{x^2+10x+25}}}$

Q2 – 2 $\boldsymbol{f(x) = \frac{1+x}{\sqrt{2x-3}-3}}$

Q2 – 3 $\boldsymbol{f(x) = \frac{1-2x}{x^2+16}}$

Question 3 **2 Marks for each**

A. Determine whether the following functions are the same or not

1. $f(x)=\dfrac{x-1}{\sqrt{x}+1}$, and $g(x)=\sqrt{x}-1$.
2. $s(x)=\sqrt{\dfrac{x}{x+1}}$, and $t(x)=\dfrac{\sqrt{x}}{\sqrt{x+1}}$.

B. If $f(x)=\dfrac{3}{x+4}$ and $g(x)=\dfrac{x+3}{x-2}$. Find the domain of $\dfrac{f}{g}$.

Q3 – A1 $\boldsymbol{f(x)=\frac{x-1}{\sqrt{x}+1}}$ ***and*** $\boldsymbol{g(x)=\sqrt{x}-1}$

Q3 – A2 $\boldsymbol{s(x)=\sqrt{\frac{x}{x+1}}}$ ***and*** $\boldsymbol{t(x)=\frac{\sqrt{x}}{\sqrt{x+1}}}$

Q3 – B $If\ f(x) = \frac{3}{x+4}\ and\ g(x) = \frac{x+3}{x-2}\ Find\ the\ domain\ of\ \frac{f}{g}$

Question 4 **2 Marks for each**

If $f(x) = \dfrac{-2}{3-2x}$

1. Show that f is monotonic on its domain.
2. Find the intercepts of f.
3. Show that f is one-to-one function.
4. Find $f^{-1}(x)$ and R_f (range f).

Q4 – 1+2+3+4 $If\ f(x) = \frac{-2}{3-2x}$

Question 5 **2 Marks for each**

A. If $f(x) = \sqrt{4 - x^2}$, and $g(x) = \sqrt{x - 1}$. Find $f \circ g$ and it's domain.

B. If f is an even function and g is an odd function. Determine algebraically whether the following function is even, odd or neither.

$$h(x) = \frac{(f \circ g)(x)}{|x| + 2}$$

Q5 – A

Q5 – B