King Fahd University of Petroleum and Minerals

Prep-Year Math Program

Math 001-35 Class Test I
Textbook Sections: R.1 to R.7
Term 131

Instructor: Sayed Omar

Student's Name: ……………KEY………………………………………………
ID #:………………………. **Section:** ……. **Serial Number:** …….

Provide neat and complete solutions.
Show all necessary steps for full credit and write the answer in simplest form.

No Calculators, Pagers, or Mobiles are allowed during this exam.

Question	**Points**	Student's Score
1	5	
2	8	
3	6	
4	6	
5	8	
6	6	
7	6	
8	6	
Total	**100**	

Name: ………………………………….**ID #:**………………………. **Serial Number:** …….

Show all necessary steps for full marks.

Question 1: (5 points): (Textbook R.2 Exercise 75, page 18): Use the distributive property to calculate the expression $123\frac{5}{8}\cdot 1\frac{1}{2}-23\frac{5}{8}\cdot 1\frac{1}{2}$

Solution:

$$123\frac{5}{8}\cdot 1\frac{1}{2}-23\frac{5}{8}\cdot 1\frac{1}{2}=1\frac{1}{2}\left(123\frac{5}{8}-23\frac{5}{8}\right)=\frac{3}{2}(100)=1.5(100)=150$$

Question 2: (8 points): Write each of the following without the absolute value symbols.

(a): $|-x|$, if $x<0$,

(b): $|3.14-\pi|$

(c): $|-8-4m|$, if $m>-2$

(d): $|2m+11|+|2m-22|$, if $-5<m<10$.

Solution:

(a): $|-x|=-x$, if $x<0$,

(b): $|3.14-\pi|=-(3.14-\pi)=\pi-3.14$ (Because $3.14-\pi<0$)

(c): $|-8-4m|=-(-8-4m)=8+4m$ (Because $-8-4m<0$ for $m>-2$)

(d): $|2m+11|+|2m-22|=(2m+11)+[-(2m-22)]=2m+11-2m+22=33$

Question 3: (6 points): $\dfrac{4x^3-8x^2+4x+6}{2x-1}=?$

Solution:

3) When dividing $\frac{4x^3-8x^2+4x+6}{2x-1}$ the remainder is:

A) $\frac{13}{2}$

B) $\frac{1}{2}$

C) 6

D) $\frac{11}{2}$

E) $-\frac{1}{2}$

$$\begin{array}{r} 2x^2-3x+\frac{1}{2} \\ 2x-1\,\overline{)\,4x^3-8x^2+4x+6} \\ -(4x^3-2x^2) \\ \hline -6x^2+4x \\ -(-6x^2+3x) \\ \hline x+6 \\ -(x-\frac{1}{2}) \\ \hline 6+\frac{1}{2}=\frac{13}{2} \end{array}$$

Answer: $\dfrac{4x^3-8x^2+4x+6}{2x-1}=2x^2-3x+\dfrac{1}{2}+\dfrac{\frac{13}{2}}{2x-1}$

Question 4: (6 points): If $A=\{x\,|\,x\le -2\}\cup\{x\,|\,x\ge 1\}$ and $B=\{x\,|\,x>-3\}\cap\{x\,|\,x<5\}$ then the set $A\cap B$ in interval notation is equal to

~~(a)~~ $(-3,-2]\cup[1,5)$

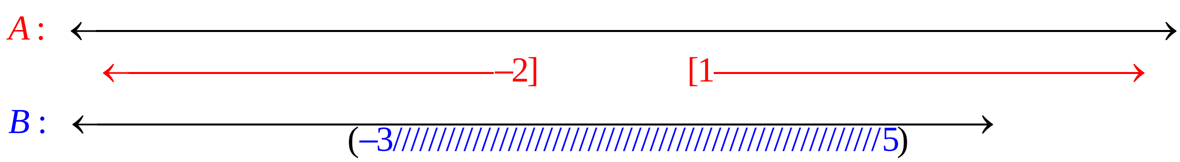
(b) $[-2,5)$

(c) $(-\infty,-3)\cup[1,\infty)$

(d) $(-3,1]$

(e) the empty set ϕ

Solution:



$$A\cap B=(-3,-2]\cup[1,5)$$

Question 5: (8 points): Given the polynomial $(3x^2-2)^2-(2x^2-x-3)(2x^2-x+3)$

Write down the following:

The leading coefficient	The constant Term	The coefficient of x^2	Degree

Solution:

$$f(x)=(3x^2-2)^2-(2x^2-x-3)(2x^2-x+3)$$
$$=9x^4-12x^2+4-\left[(2x^2-x)-3\right]\left[(2x^2-x)+3\right]$$
$$=9x^4-12x^2+4-\left[(2x^2-x)^2-3^2\right]$$
$$=9x^4-12x^2+4-\left[4x^4-4x^3+x^2-9\right]$$
$$=5x^4+4x^3-13x^2+13$$

The leading coefficient	The constant Term	The coefficient of x^2	Degree
5	13	–13	4

Question 6: (6 points): (R.4 Exercise 22, 23) : Factor

(a): $15-5m^2-3r^2+m^2r^2$

(b): $p^2q^2-10-2q^2+5p^2$

Solution:

22. $15-5m^2-3r^2+m^2r^2$
$=(15-5m^2)-(3r^2-m^2r^2)$
$=5(3-m^2)-r^2(3-m^2)$
$=(3-m^2)(5-r^2)$

23. $p^2q^2-10-2q^2+5p^2$
$=p^2q^2-2q^2+5p^2-10$
$=q^2(p^2-2)+5(p^2-2)$
$=(p^2-2)(q^2+5)$

Question 7: (6 points): (R.5 Exercise 58) : Simplify $\frac{5}{x+2}+\frac{2}{x^2-2x+4}-\frac{60}{x^3+8}=?$

Solution:

58. $\frac{5}{x+2}+\frac{2}{x^2-2x+4}-\frac{60}{x^3+8}=\frac{5}{x+2}+\frac{2}{x^2-2x+4}-\frac{60}{(x+2)\left(x^2-2x+4\right)}$

$=\frac{5\left(x^2-2x+4\right)}{(x+2)\left(x^2-2x+4\right)}+\frac{2(x+2)}{(x+2)\left(x^2-2x+4\right)}-\frac{60}{(x+2)\left(x^2-2x+4\right)}$

$=\frac{5\left(x^2-2x+4\right)+2(x+2)-60}{(x+2)\left(x^2-2x+4\right)}=\frac{5x^2-10x+20+2x+4-60}{(x+2)\left(x^2-2x+4\right)}$

$=\frac{5x^2-8x-36}{(x+2)\left(x^2-2x+4\right)}=\frac{(x+2)(5x-18)}{(x+2)\left(x^2-2x+4\right)}=\frac{5x-18}{x^2-2x+4}$

Question 8: (5 points): (R.7 Exercise 89) : Simplify $\frac{1}{\sqrt{2}}+\frac{3}{\sqrt{8}}+\frac{1}{\sqrt{32}}$

Solution:

89. $\frac{1}{\sqrt{2}}+\frac{3}{\sqrt{8}}+\frac{1}{\sqrt{32}}=\frac{1}{\sqrt{2}}+\frac{3}{\sqrt{4\cdot 2}}+\frac{1}{\sqrt{16\cdot 2}}$

$=\frac{1}{\sqrt{2}}+\frac{3}{2\sqrt{2}}+\frac{1}{4\sqrt{2}}$

$=\frac{4\cdot 1}{4\sqrt{2}}+\frac{3\cdot 2}{2\cdot 2\sqrt{2}}+\frac{1}{4\sqrt{2}}$

$=\frac{4}{4\sqrt{2}}+\frac{6}{4\sqrt{2}}+\frac{1}{4\sqrt{2}}$

$=\frac{4+6+1}{4\sqrt{2}}=\frac{11}{4\sqrt{2}}$

$=\frac{11\sqrt{2}}{4\sqrt{2}\cdot\sqrt{2}}=\frac{11\sqrt{2}}{4\cdot 2}=\frac{11\sqrt{2}}{8}$