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جامعة بيرزيت
BIRZEIT UNIVERSITY

Mathematics Department
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FIRST EXAM – MATH 141

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Section: 4

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Answer sheet for the multiple choice quastion:

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1	d
2	a
3	b
4	b
5	c

Page 2	
6	b
7	d
8	c
9	b
10	x

Page 3	
11	d
12	a
13	b
14	d
15	c

Page 4	
16	d
17	d
18	x
19	b
20	b

Question 1. (20%).Circle the most correct answer:

1. If $\sin x = \frac{3}{5}$, $x \in [\frac{\pi}{2}, \pi]$, then $\cos x =$
   (a) $\frac{3}{5}$.
   (b) $\frac{4}{5}$.
   (c) $\frac{-3}{5}$.
   (d) $\frac{-4}{5}$.

2. $\lim_{x\to 7}\sqrt{(11-x)} = 2$, given $\epsilon = 1$ find the largest δ such that $0 < |x-7| < \delta$, then $|\sqrt{(11-x)} - 2| < \epsilon$
   (a) $\delta = 3$
   (b) $\delta = 5$
   (c) $\delta = 4$
   (d) $\delta = 2$

3. $\lim_{x\to\infty} \frac{x^2 - 7x}{x+1} =$
   (a) $-\infty$
   (b) ∞
   (c) 1
   (d) -7

* 4. Consider the function $f(x) = \frac{x^2 - 3x - 4}{16 - x^2}$, then the vertical asymptote/s is/are
   (a) $x = 4$
   (b) $x = -4$
   (c) $x = 4$, $x = -4$
   (d) None of the above

5. The domain of the function $f(x) = \frac{\sqrt{2-x}}{x+1}$ is
   (a) $[-2, 1) \bigcup (1, \infty)$
   (b) $(-\infty, 2]$
   (c) $(-\infty, -1) \bigcup (-1, 2]$
   (d) $(-\infty, -1) \bigcup (-1, 2)$

6. $\lim_{x\to\infty}\sqrt{\frac{8x^2-3}{2x^2+x}} =$

(a) $-\infty$

(b) 2

(c) ∞

(d) 4

7. The graphs of the functions $f(x)=x^2-5x+2$ and $g(x)=-2x^3+4x+3$ intersect over the interval

(a) $(-2,-1)$

(b) $(0,1)$

(c) $(1,2)$

(d) $(2,3)$

8. Find value/s of b for which the function $f(x)$ is continuous for all values of x

$$f(x)=\begin{cases}\frac{\sin(3x)}{4x}, & x\neq 0;\\ b-4x, & x=0.\end{cases}$$

(a) $\frac{1}{2}$.

(b) $\frac{-1}{2}$.

(c) $\frac{3}{4}$.

(d) $\frac{3}{2}$.

9. The range of $f(x)=\frac{1}{x-2}+3$ is

(a) $(-\infty,3)\cup(3,\infty)$

(b) $(0,\infty)$

(c) $(-\infty,\infty)$

(d) $(-\infty,\infty)-2$

10. $\lim_{x\to 0}\frac{\cos^2 x-1}{x\sin(2x)} =$

(a) 0

(b) $\frac{-1}{2}$

(c) $\frac{1}{2}$

(d) DNE

11. The function $f(x) = \dfrac{x^2+7x+12}{x^3-9x}$ has a removable discontinuity at

(a) $x = -3$ and $x = 3$

(b) $x = 3$

(c) $x = 0$

(d) $x = -3$

12. The period of $y = \cos(\frac{\pi x}{2} - \frac{2}{\pi})$ is

(a) 4

(b) $\frac{2}{\pi}$

(c) 2π

(d) $\frac{\pi}{2}$

13. $\lim\limits_{x \to -\infty} \dfrac{\sin(x)}{x}$

(a) -1

(b) 0

(c) 1

(d) DNE

14. $\lim\limits_{x \to 0^+} \dfrac{\sqrt{x^2+4x+1}-1}{x} =$

(a) 4.

(b) -2.

(c) -4.

(d) 2.

15. The horizontal asymptote of $f(x) = \frac{1-x^2}{x^2+1}$

(a) $y = 0$

(b) $y = 1$

(c) $y = -1$

(d) None of the above.

16. If the graph of the circle $x^2 + y^2 = 25$ is shifted upward by 3 units, and leftward by 4 units, then the new formula of the circle is

(a) $(x+4)^2 + (y+3)^2 = 25$
(b) $(x-4)^2 + (y+3)^2 = 25$
(c) $(x-4)^2 + (y-3)^2 = 25$
(d) $(x+4)^2 + (y-3)^2 = 25$

17. The function $f(x) = |x| + x\cos x$ is

(a) odd function.
(b) even function.
(c) both even and odd function.
(d) neither even nor odd function.

18. Let $g(x) = \sqrt{x}$ and $(g \circ f)(x) = |x|$, then $f(x) =$

(a) $f(x) = -x^2$
(b) $f(x) = \frac{1}{x^2}$
(c) $f(x) = x^2$
(d) $f(x) = \frac{-1}{x^2}$

19. $\lim_{x \to -1^+} \frac{|x+1|}{2x+2} =$

(a) $\frac{-1}{2}$
(b) $\frac{1}{2}$
(c) 0
(d) DNE

20. $\lim_{x \to 0} \frac{2\cos x}{\sqrt{(x+1)} - 2} =$

(a) 0
(b) -2
(c) $\frac{1}{2}$
(d) DNE

Question 2. *(5%) Let* $f(x) = \dfrac{x}{4 - x^2}$ *Sketch the graph of* $f(x)$ *where;*

Domain of $f(x)$ *is* $(-\infty, \infty) - \{-2, 2\}$

$f(0) = 0$

$\lim_{x \to \infty} f(x) = 0, \lim_{x \to -\infty} f(x) = 0$

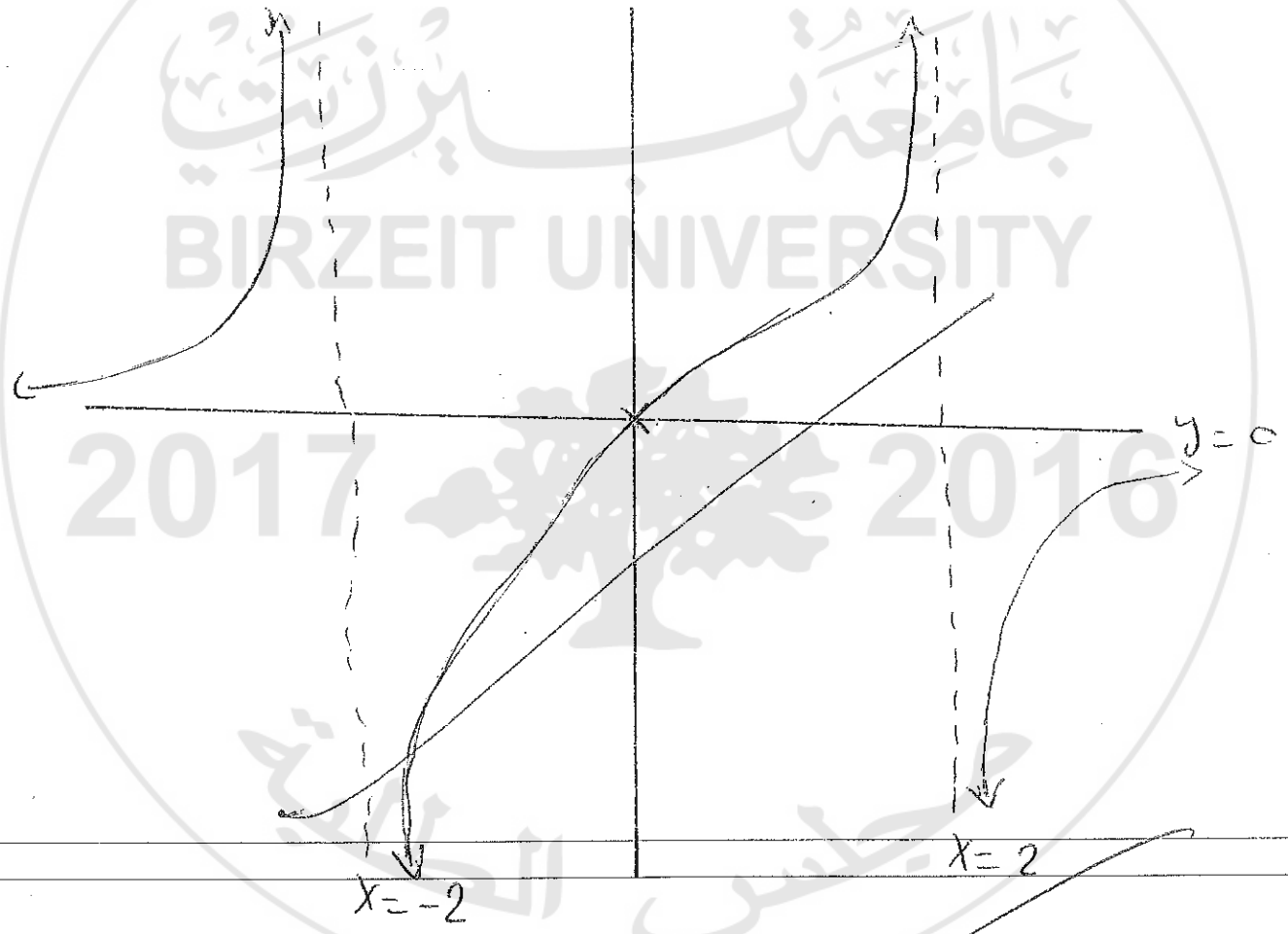
$\lim_{x \to 2^+} f(x) = -\infty, \lim_{x \to 2^-} f(x) = \infty$

$\lim_{x \to -2^+} f(x) = -\infty$ *and* $\lim_{x \to -2^-} f(x) = \infty.$

y=0 H.Asy

x=-2 V.Asy

x=2 V.Asy



b