UNN POST UTME PAST QUESTIONS AND ANSWERS

FOR MATHEMATICS

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MATHEMATICS 2005/2006 QUESTIONS

1. Find n if 31410 – 2567 = 340n

   A. 7 B. 8
   C. 9 D. 10

2. What is the difference between 1.867551 correct to four significant figures and 1.867551 correct to four decimal places?

   A. 5×10^{-3} B. 4×10^{-4}
   C. 5×10^{-4} D. 10×10^{-3}

3. In an examination, all the candidates offered at least one of English and French, if 52% offered French and 65% offered English, what percentage offered French only?

   A. 17 B. 35%
   C. 48% D. 45%

4. Simplify $\frac{6x^2+5x^2}{2x^2+x-3}$

   A.3x-1 B. 1-3x
   C. 3x+1 D. –(3x1)

5. Find the range of value of x satisfying the inequalities 2x – 5< 7 and 25 + 2x > 15

   A. 5<x<6 B. -5<×<6
   C. -6<×<5 D. -6<×<-5

6. If the 8^{th} term of an A.P is three times the second term and the sum of the first three terms is 18, find the first term of the A.P.

   A.4 B. 2
   C. 8 D. 3

7. Find the sum of infinity f the series 4+3 + 9/4+27/19+……

   A.16 B. $\frac{16}{3}$
   C. 1 D. 8

8. A chord of a circle or radius 10cm is drawn 8cm from the center of circle. Find the length of the chord.

   A.6cm B. $2\sqrt{14cm}$
   C. 12cm D.$\sqrt{41cm}$ 3

9. Fins the equation of the fine which passes through (-2,1) and is perpendicular to the line 4x-2y+1 = 0.

   A.2y-x-4 = 0 B.2y + x = 0
   C. 2y-x = 0 D. y-2x-5 = 0

10. If a is parallel to the line 2y-rx+4 = 0 and perpendicular to the line 4y+x-28 = 0, then the value of r is
    A.4 B. 8
    C. -8 D. -4

11.

Score	0	1	2	3	4	5
No of student	2	8	14	16	12	8

The distribution above shows the scores of sixty students in a class test. What percentage of the students scored at least 3?

A.60% B. 36%
C. 66% D. 40%

12. The first derivative of $y = (2+3x)^4$ at x = -1 is
    A.12 B. -12
    C. 4 D. -4

13. The minimum value of (x) = x^2-4x+5 in the interval [1, -1] is

    A.-2 B. 10
    C. 4 D. 5

14.

Score	1	2	3	5	6
Frequency	3	6	7	X	4

The table above shows the marks scored by a group of students in a class test. If the mean score is 3.4, find x.
A.3 B. 4
C. 5 D. 2

15. A company is to select three different handset phones from five different types of Nokia brand and two different types of Samsung brand. In how many ways can the company choose the handsets, so as to include at least one Samsung brand?
    A.15 B. 25
    C. 35 D. 45

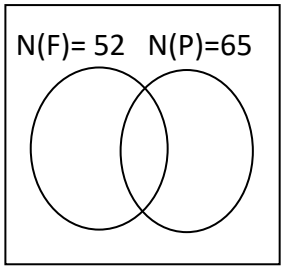
MATHEMATICS 2005/2006 SOLUTIONS

1. 314_{10}-256_7 = 340_n
   314^{10} $(2\times7^2+5\times7^1 + 6\times7^0)$ = 3x

$n^2 + 4\times n^1 + 0\times n^0$
$314-139 = 3n^2 + 4n$
$3n^2 + 4n-175 = 0$
$(n-7)\left(n+\frac{25}{2}\right) = 0$
n = 7 or n = -25/2 (impossible)
$\therefore n = 7$ ***Ans. A***

2. 1.867551 to 4 sign. Fig. = 10868
   1.867551 to 4 d.p. = 1.8676
   Difference: $1.868-1.8676 = 0.0004 = 4\times10^{-4}$
   Ans. B

3. $\sum = 100$



Let x be the percentage that offered both French and English. Percentage that offered French alone = 52-x
Percentage that offered English alone = 65-x
$\rightarrow 52 - x + x += 100$
$117 - x = 100$
X= 117 - 1000 = 17

∴ Percentage that of offered French only = 2%-17% = 35%
Ans. B

4. $2\times2 + x - 3\overline{)6x^3 + 5x^2 - 8x - 3}$
   $\frac{-6x^3+3x^2-9x}{-2x^2+x-3}$
   $\frac{2x^2+x-3}{0\quad 0\quad 0}$

   Hence, the quotient = 3x + 1

   Ans. C

5. 2x-5<7 and 25+2x>15
   2x<12 and 2x>-10
   X<6 and 2x> - 10(or x >-5)
   -5< × <6
   Ans. B

6. $U_8 = 3U_2$, S3 = 18, U_1 =?
   a +7d = 3(a+d)→a + 7d = 3a + 3d→
   a +7d-3a – 3d = 0
   -2a + 4d = 0→ 2a-4d = 0 ….. (1)

$S_n = \frac{n}{2}[2a + (n-1)d]$

$S_3 = 18 = \frac{3}{2}[2a + (3-1)d]$

→2a + 2d = $\frac{18\times2}{3}$

→2a + 2d = 12

$\therefore a + d = 6 \ldots\ldots\ldots\ldots (2)$

From equation (2), a = 6-d

Substitute 6 – d for a into equation (1), 2(6-d) – 4d = 0

→ 12 – 2d – 4d = 0 → -6d = -12 $\therefore d = 2$

Hence, a + 2 = 6 → a = 6-2 = 4

U_1 = a = 4

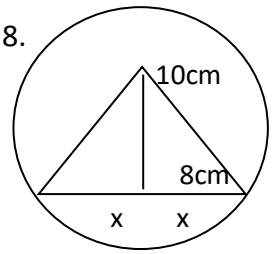
Ans. A

7. $S_\infty \frac{a}{1-r}; r = r\frac{\frac{9}{4}}{3}; a = 4$

$S_\infty = \frac{4}{1-\frac{3}{4}} = 16 \rightarrow S_\infty = 16$

Ans. A

8.



Length of chord = 2x

Using Pythagoras rule, x = $\sqrt{10^2 - 8^2}$ = 6cm

Length of chord = 2×6 = 12cm

Ans. C

9. Equation of the given line is
4x – y + 1 = 0

i.e. y = 2x + ½
Gradient of the line, m_1 = 2

Let the gradient of the perpendicular line be m_2. For perpendicular lines, $m_1m_2 = -1 \rightarrow m_2 = -1/m_1$

$M_2 = -1/2$ through (-2,1)

Hence, the required equation is

$y - 1 = -1/2 [x - (-2)]$

$y - 1 = -1/2(x + 2)$ or $2y + x = 0$

Ans. B

10. Line 1 is 2y-rx+4i.e. $y=\frac{r}{2}x-2$

Line 2 is $4y + x - 28 = 0$ i.e. $y = \frac{1}{4}x+7$

Gradient of line 1 = $m_1 \frac{r}{4}$ gradient of line 2 = M_2 = ¼

If line 1 and line 2 are perpendicular, then $m_1m_2 = -1$

$$\rightarrow \frac{r}{2} \times \frac{-1}{4} = -1 \rightarrow r = 8$$

Ans. B

11. No of student that scored at least 3 = 16 + 12 + 8 = 36 students

Total no of students = 60

Percentage that scored at least 3 = 36/60 × 100% = 60%

Ans. A

12. $Y = (2 + 3x)^4$

$= 4(2 + 3x)^3 .3 = 12 (2 + 3x)^3$

At x =-1, $= 12(2+3(-1)3=-12)$

Ans. B

13. $F(x) = x2-4x + 5$

$f'(x) = 2x - 4$

In the interval [1,1], $f'(x) = 2(1) - 4 = -2$

Ans. A

14.

Score (x)	Frequency (f)	Fx
1	3	3
2	6	12
3	7	21
5	X	5x
6	4	24
	$\sum f = 20 + x$	$\sum fx = 60 + 5x$

Mean = $\frac{\sum fx}{\sum f} = 3.4 \rightarrow \frac{60+5x}{20+x} = 3.4$
60+5x = 3.4 (20 + x) →60 + 5x = 68 + 3.4x
5x – 3.4 = 68-60 → 1.6x = 8
Therefore, x = 5
Ans. C

15. No of Nokia bran = 5, No of Samsung brand = 2 if 3 different handset phones are to be selected and at least 1 Samsung brand must be selected and at least 1 Samsung brand must be included, then it is either they select 2 Nokia brand from 5 and 2 Samsung brand from 2. That is, $^5C_2 \times {}^2C_1$ or $^5C_1 \times {}^2C_2 = 10\times2+5\times1=20+5=25$ ways. **Ans. B**

SUMMARY OF ANSWERS (MATHEMATICS 2005/2006)

1. A 2.B. 3.B 4.C 5.B 6.A 7.A 8.C 9.B 10.B 11.A 12.B 13.1 14.C 15.B

MATHEMATICS 2007/2008 QUESTIONS

1. Express $8\times10^{-6} + 2\times10^{-5}$ as a fraction
   A.1/4 B. 3/2
   C. 2/5 D. 1/5

2. Find the values of x for which $2^{2x+3} + 33 \times 2x + 4 = 0$
   A. x=2, x= -3
   B. x=-2, x= 3
   C. x=4, x=1/8
   D. x=2, x=3

3. If $260_9 \div 100_2 = 66_n$, find n
   A.7 B. 9
   C. 10 D. 8

4. Find the values of x such that
   $\begin{pmatrix} 2 & 7 \\ 3 & 1/2 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 10 \\ 7 \end{pmatrix}$

   A. x=y=2
   B. x=2, y=-2
   C. x=12, y=2
   D. x=y=-2

5. A chord of a circle of radius 13cm is drawn 5cm from the centre of the circle. Find the length of the chord.

   A. 12cm B.24cm
   C. 18cm D. $\sqrt{194cm}$

6. If x-2 is a factor of $px^3 + 2x^2-2p+12$, find the value of p.
   A. 8/5 B. -10/3
   C. 2 D. -2

7. In a regular pentagon ABCDE, AC intersects BD at P. calculate < CPD.
   A.108^0 B. 36^0
   C. 72^0 D. 48^0

8.

Subject	Biology	Chemistry	Maths	physics
Marks	95	2x + 10	X	75

   The table above shows the marks obtained by a student in an examination. If the total mark obtained is 300, what is the angle corresponding to the mark obtained in Chemistry if the information is represented in a pie chart?
   A.120^0 B.144^0
   C. 48^0 D. 108^0

9. A ladder 17m rests against a vertical wall so that its foot is 8.5m from the wall. Find the angle of inclination of the ladder to the horizontal floor.
   A.30^0 B.45^0
   C. 60^0 D. 55^0

10. Evaluate $\lim_{x-2} \frac{x^2+x-6}{x-2}$
    A.0 B. 5
    C. ∞ D. 1

11. If $\frac{dy}{dx} = 6x-3$ and y(-1) = 8, find y (x)

    A.$3x^2-3x-8$ B. $3x^2-3x+8$
    C. $3x^2-3x-2$ D. $3x^2-3x+2$

12. The minimum of the function $f(x) = 2x^2-12x + 5$ is
    A.59 B. -59
    C.3 D. -3

13. A basket contains 5 MTN cards, 6 GLO cards, 3 MTEL cards and 6 Vmobiles cards. What is the probability that a card selected from the basket at random will be MTN or MTEL card?
    A. 3/20 B. ¾
    C. ¼ D. 2/5

14. Find the range of the numbers 1/3, ½, 3/5, 4/5, 2/3, 6/7, 8/9
    A.7/27 B.13/45
    C. 9/5 D. 5/9

15. If the mean of the numbers 4, 3, 5, x, 7, is 5, find the variance:
    A.2 B.10
    C.$\sqrt{2}$ D. 5

MATHEMATICS 2007/2008 SOLUTIONS

1. $8 \times 10^6 \div 2 \times 10^{-5} = \frac{8}{10^6} \div \frac{2}{10^5} = \frac{8}{10^6} \times \frac{10^5}{2} = \frac{8}{2} \times \frac{10^5}{10^6} = \frac{4}{10} = \frac{2}{5}$

Ans. C

2. $2^{2x+3} - 33 \times 2^x + 4 = 0$
   $2^{2x} \times 2^3 - 33 \times 2^x + 4 = 0$
   $8 \times (2^x)^2 - 33(2^x) + 4 = 0$

   Let $2^x = p$
   $8p^2 - 33p + 4 = 0$
   $(8p-1)(p-4) = 0$
   $P = 1/8$ or $p = 4$
   But $= p = 1/8$
   $= 8^{-1} = 2^{-3} \times = -3$ OR
   $= p = 4 = 2^2$, $x = 2$

   $\therefore x = 2 \; or \; -3$

   Ans. A

3. $\frac{260_9}{100_2} = 66_n \frac{(2\times9^2)+}{(1\times2^2)} \frac{(6\times9^1)+(0\times9^0)}{+(0\times2^2)+(0\times2^0)}$
   $= 6 \times n^1 + 6 \times n^o$

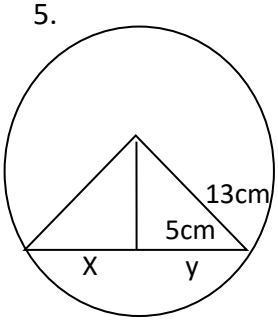
   $\frac{216}{4} = 6n + 6$

   $4(6n + 1) = 216$
   $4 \times 6(n + 1) = 216$
   $n + 1 = \frac{216}{4\times6} = 9$
   $n + 1 = 9$
   $n = 9-1 = 8$

Ans. D

4. 2x-7y = 10……(1)
   3x + ½x = -7…….(2)
   Solving equations 1 and 2
   Simultaneously gives x = -2 and y = -2

   Ans. D

5. 

   Length of chord = 2x
   X = $\sqrt{13^2 - 5^2}$
   X = 12cm
   Length of chord = 2 x 12 = 24cm

   Ans. B

6. Let $f(x) = px^3 + 2x^2 - 2p + 12$
   If x-2 is a factor of f(x), f(2) = 0
   $F(2) = p(2)^3 + 2(2)^2 - 2p + 12 = 0$
   $8p + 8 - 2p + 12 = 0$
   $8p - 2p + 12 = 0$
   $6p = -20$
   $P = -20/6 = -10/3$

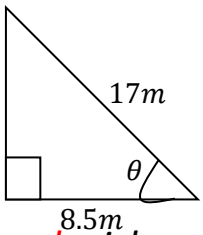
   Ans. B

7. A regular pentagon has five equal sides and all the angles are equal. Sum of interior angles = $(2n - 4) \times 90^o$
   Where n = 5, sum of interior angles = $[(2 \times 5)4] \times 90^o = 540^o$
   Therefore, each angle = $540^o/5 = 108^o$
   Required angle = $180^o - 108^o = 72^o$

   Ans. C

8. 95 + 2x + 10 + x + 75 = 300
   3x + 180 = 300
   3x = 300 – 180 = 120
   X = 120/3 = 40
   Mark obtained in chemistry = 2x + 40 = 2 × 40 + 10 = 90
   Angle of mark = $\frac{90}{300} \times 360^o = 108^o$

   Ans. D

9. 

   $Cos\ \theta = \frac{8.5}{17} = 0.5$

   $\theta = cos^{-1}(0.5) = 60^o$

Ans. B

10. $Lim_{x\to 2}\frac{x^2\pm 6}{x-2}$

Using L'Hopitals rule, we let g(x)

$$\frac{g(x)}{h(x)} = \frac{2x+1}{1}$$

As x $\rightarrow$ 2, $\frac{g(x)}{h(x)} = \frac{2x+1}{1}$

As x $\rightarrow$ 2,

zz

Ans. B

11. $\frac{dy}{dy} = 6x - 3, y(-1) = 8$

$$dy = (6x-3)dx$$

$$\int dy = \int (6x-3)dx$$

$$y = \frac{6x^2}{2} - 3x + c$$

$$y = 3x^2 - 3x + c$$

$$\rightarrow y(x) = 3x^2 - 3(-1) + C = 8$$

$$3 + 3 + C = 8$$

$$C = 2$$

Therefore, y(x) = $3x^2 - 3x + 2$ ***Ans. D***

12. $f(x) = 2x^2 - 12x^{-5}?$

$$f(x) = 4x - 12 = 0?$$
$$4x - 12 = 0$$

4x=12

X=3

Ans. C

13. MTN Cards = 5, Glo Cards = 6, MTEL Cards =3, Vmobile Cards = 6 Total Cards = 20 Prob (MTN or MTEL) = 5/20 = 8/20 = 2/5

$$\boldsymbol{Ans.D}$$

14. $Range = \frac{8}{9} - \frac{1}{3} = {}^{5}/_{9}$

Ans. D

15. $\frac{4+3+5+x+7}{5} = 5 \rightarrow \frac{19+x}{5} = 5$

19 + x = 25 – 19 = 6,
Variance = (standard deviation)²
⟶ variance -

$$Variance = \frac{\sqrt{\sum(x-x)^2}^2}{n} = \frac{\sum(x-\frac{i}{x})^2}{n}$$

$$\frac{(4-5)^2+(3-5)^2+(5-5)^2+(5-5)^2+(7-5)^2}{5}$$

$$= \frac{1+4+0+1+4}{5}$$

$$= \frac{10}{5} = 2$$

$$\boldsymbol{Ans.A}$$

SUMMARY OF ANSWERS (MATHEMATICS 2007/2008)

1.C 2.A 3.D 4.B 5.B 6.B 7.C 8.D 9.B. 10.B 11.D 12.C 13.D 14.D 15.A

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