A **MULTIPLE CHOICE PART**

1. Let $f\ x \quad x^3 \quad 3x^2 \quad 5 \quad , x \qquad 1,2$. Then the absolute maximum of the function is:

   a. 12

   b. 4

   c. 5

   d. 3

   e. 6

2. If $x \quad \sin xy$, then $\frac{dy}{dx}$ equals to:

   a. $\frac{1 \quad y\cos xy}{x\cos xy}$

   b. $\frac{1 \quad y\cos xy}{x\cos xy}$

   c. $\frac{1}{x\cos xy}$

   d. $\frac{1}{x\sin xy}$

   e. $\frac{x\cos xy}{1 \quad y\cos xy}$

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3. For the graph of the function $f\ x \quad x^4 \quad 2x^3 \quad 8x \quad 5$, one of the following is FALSE:

a. There is an inflection point at $x \quad 0$.

b. There is an inflection point at $x \quad 1$.

c. There is an inflection point at $x \quad 2$.

d. The graph is concave up in the interval $0, \quad$.

e. The graph is concave down in the interval $1, 0$.

4. $\lim\limits_{x \ 3} \dfrac{\frac{1}{x^2} \quad \frac{1}{9}}{x \quad 3}$

a. $\frac{2}{27}$.

b. $\frac{2}{27}$.

c. $\frac{1}{9}$.

d. $\frac{1}{9}$.

e. 6.

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5. The velocity of a moving particle is $v\ t \quad t^2 \quad 2t \quad 3\ ,\ t \quad 0,4$ .Then the distance that the particle has travelled is equal to :

a. $\frac{20}{3}$.

b. $\frac{20}{3}$.

c. $\frac{28}{3}$.

d. 6.

e. $\frac{34}{3}$.

6. $\overline{2} \quad {}_{0} \quad \frac{\cos x}{\sqrt{1 \quad \sin x}}\, dx$

a. $\sqrt{2} \quad 1$.

b. $\frac{1}{\sqrt{2}} \quad 1$.

c. $2\sqrt{2} \quad 2$.

d. $2\sqrt{2} \quad 2$.

e. $\sqrt{2} \quad 1$.

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7. The shortest distance between the point $P(1,0)$ and the line $y = 4 - 2x$ is equal to:

a. $\frac{2}{\sqrt{5}}$.

b. 1.

c. $\frac{1}{2}$.

d. $\frac{1}{\sqrt{5}}$.

e. 0.

8. $\int_{1}^{4} \frac{15(x-1)^2}{\sqrt{x}}\,dx$

a. 540.

b. 270.

c. 96.

d. 76.

e. 81.

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9. For the function $f\,x \quad \sin 2x \quad x\ ,x \quad 0,2$. Then all the critical numbers are:

a. $\frac{5}{6}\ ,\frac{2}{3}\ ,\frac{4}{3}\ ,\frac{7}{6}.$

b. $\frac{}{3}\ ,\frac{2}{3}\ ,\frac{4}{3}\ ,\frac{5}{3}.$

c. $\frac{}{3}\ ,\frac{}{6}\ ,\frac{}{2}\ ,\frac{5}{3}.$

d. $\frac{}{6}\ ,\frac{5}{6}\ ,\frac{7}{6}\ ,\frac{}{2}.$

e. $0\ ,\frac{}{2}\ ,\frac{3}{2}\ ,\frac{2}{3}.$

10. The integral $\overset{2}{\underset{1}{\ }}\ 3x \quad 1 \quad x \quad 1\ ^{10}dx$ (after a suitable substitution) is equivalent to the integral :

a. $\overset{1}{\underset{0}{\ }}\ u^{10}\ 3u \quad 1\ du.$

b. $\overset{7}{\underset{1}{\ }}\ u\ u \quad 1\ ^{10}du.$

c. $\overset{1}{\underset{0}{\ }}\ u^{10}\ 3u \quad 4\ du.$

d. $\overset{2}{\underset{1}{\ }}\ u^{10}\ 3u \quad 1\ du.$

e. $\overset{2}{\underset{1}{\ }}\ u^{10}\ 3u \quad 4\ du.$

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11. If $g\ x \quad \sqrt{x} f\ x$, and $f\ 1 \quad 4$, $f\ \ 1 \quad 5$, then $g\ \ 1$ is equal to:

a. 3.

b. $\frac{5}{2}$.

c. 5.

d. 4.

e. 20.

12. The equation of the tangent line to the curve $f\ x \quad \frac{x}{1 \quad x^2}$ at $x \quad 2$ is equal to:

a. $3y \quad 3x \quad 8 \quad 0$.

b. $9y \quad 5x \quad 16 \quad 0$.

c. $3y \quad 3x \quad 8 \quad 0$.

d. $9y \quad 5x \quad 16 \quad 0$.

e. $y \quad 9x \quad 4 \quad 0$.

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13. $\sum_{k\ 1}^{10} k^3 \quad 5k \quad 2$

a. 1300.

b. 2770.

c. 5540.

d. 1385.

e. 948.

14. For the graph of the rational function $f\ x \quad \frac{x}{x^2 \quad 1}$,one of the following is <u>TRUE</u> :

a. $y \quad 1$ is a horizontal asymptote.

b. $x \quad 1$ is a vertical asymptote.

c. Has one oblique asymptote.

d. Has no asymptote at all.

e. $y \quad 0$ is a horizontal asymptote.

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15. The function $f\ x \quad x^4 \quad 2x^2 \quad 3$,has:

a. one real zero ,only.

b. two real zeros , only.

c. no real zero.

d. three real zeros ,only.

e. four real zeros ,only.

16. The limit $\lim\limits_{h\ 0} \dfrac{2 \quad 3h\ ^2 \quad 4}{h}$ represents the derivative of $f\ x \quad 3x^2$ at x equals to:

a. 2.

b. 6.

c. $\frac{2}{3}$.

d. 4.

e. $\frac{4}{3}$.

SOLVING PART — SHOW ALL OF YOUR WORK

17. If $y \quad \tan\ \sin x$,then find y'' .

18. Use differential to approximate the change in the volume dV of a cube with side length S equals 10 cm ,and the estimated change in the surface area dA is $0.36\ cm^2$ .Where $V \quad S^3$ and $A \quad 6S^2$.

19. Evaluate the integral $\int_0^2 x\sqrt{16 - x^4}\,dx$.

20. Give the following information (if exist) in the assigned space about the graph of the function $f\ x \quad x^{\frac{1}{3}}\ x \quad 1$:

-The critical numbers are x _________________ .

-Relative maximum at x __________________ .

-Relative minimum at x __________________.

-Inflection point(s) at x __________________.

-The function is increasing on the interval(s) __________________

-The function is decreasing on the interval(s) __________________

-The function is concave up on the interval(s) __________________

-The function is concave down on the interval(s) __________________