GREATER ATLANTA CHRISTIAN SCHOOL

AP Calculus AB

due first day of class

(1) _____ The slope of the line $3x - 4y + 8 = 0$ is

(a) $m = -4$ (b) $m = 3$

(c) $m = 3/4$ (d) $m = 4/3$

(2) _____ The domain of the function $f(x) = \ln(2x - 1)$ is

(a) all real numbers. (b) all real numbers except $x = 0$.

(c) the set $x > 0$. (d) the set $x > 1/2$.

(3) _____ If a rational function f is known to have a vertical asymptote at $x = a$ and a removable singularity at $x = b$, which of the following formulas could represent f?

(a) $f(x) = \dfrac{(x+a)^2(x+b)}{(x+a)^3(x+b)}$ (b) $f(x) = \dfrac{(x+a)}{(x+a)(x+b)}$

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

(4)) _____ If $\text{Arctan}(\tan(\theta)) = \theta$, then we know that

(a) $-\pi/2 < \theta < \pi/2$ (b) $0 < \theta < \pi$

(c) $-\pi/2 < \theta < \pi$ (d) $-\pi < \theta < \pi$

(5) _____ If $f(x) = 1 + \sin(3x - \pi/2)$, then one solution to the equation $f(x) = 3/2$ is

(a) $x = 5\pi/18$ (b) $x = 2\pi/9$

(c) $x = (60 + \pi)/6$ (d) $x = (20 + \pi)/2$

(6) _____ The slope of the line passing through the points $(-2, 1)$ and $(4, 2)$ is

(a) $m = 1/6$ (b) $m = 2$

(c) $m = -6$ (d) $m = -2$

(7) _____ If the radian measure for an angle θ is $-6\pi/5$, then the degree measure for θ is

(a) $150°$ (b) $-216°$

(c) $36°$ (d) $-150°$

(8) _____ If a rational function f is known to have a horizontal asymptote at $y = 3$, which of the following formulas could represent f?

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

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

(9) _____ Suppose A is in degree measure. We know that $\sin(A + 720^\circ)$ is equal to

(a) $\sin(A)$ (b) $\cos(A)$

(c) $-\sin(A)$ (d) $-\cos(A)$

(10) _____ The domain of the function $f(x) = e^{2x-1}$ is

(a) all real numbers. (b) all real numbers except $x = 0$.

(c) the set $x > 0$. (d) the set $x > 1/2$.

(11) _____ Let $a > 0$. If we know that $b = a^c$, then we also know

(a) $b = \log_c(a)$ (b) $a = \ln(b)$

(c) $c = \log_a(b)$ (d) $b = \ln(a)$

(12) _____ The slope of any line perpendicular to the line $y = -5x + 8$ will be

(a) $m = 1/5$ (b) $m = 5$

(c) $m = -5$ (d) $m = -1/5$

(13) _____ If a parabola is known to have a minimum at the point $(-3, 5)$, which of the following formulas could represent the parabola?

(a) $f(x) = (x-3)^2 + 5$ (b) $f(x) = (x-5)^2 + 3$

(c) $f(x) = -2(x+3)^2 + 5$ (d) $f(x) = 5(x+3)^2 + 5$

(14) _____ Suppose A is in radian measure. We know that $\cos(\pi/2 - A)$ is equal to

(a) $\cos(A)$ (b) $\sin(A)$

(c) $-\sin(A)$ (d) $-\cos(A)$

(15) _____ An algebraic formula for $y = \cot(\text{Arcsin}(3x/2))$ would be

(a) $y = \dfrac{2}{3x}$ (b) $y = \dfrac{3x}{2}$

(c) $y = \dfrac{\sqrt{4-9x^2}}{3x}$ (d) $y = \dfrac{2}{2-3x}$

(16) _____ Suppose A is in degree measure. We know that $\sin(A - 90^\circ)$ is equal to

(a) $\cos(A)$ (b) $\sin(A)$

(c) $-\sin(A)$ (d) $-\cos(A)$

(17) _____ If the point $(3, 4)$ lies on the graph of an invertible function f, then which of the following points lies on the graph of its inverse?

(a) the point $(4, 3)$ (b) the point $(3, -4)$

(c) the point $(3, 1/4)$ (d) the point $(-3, 4)$

(18) _____ The line parallel to $y = 5x + 8$ having y-intercept $(0, 4)$ has the formula

(a) $y = -(1/5)x - 4$ (b) $y = (1/5)x + 4$

(c) $y = 5x + 4$ (d) $y = -5x + 12$

(19) _____ If a is a real number, then we know that $a^{4/5}$ is equal to

(a) $\sqrt[5]{a^4}$ (b) $\sqrt[4]{a^5}$

(c) $(\sqrt[4]{a})^5$ (d) $\left(\frac{1}{a^5}\right)^4$

(20) _____ If we know that $\sec(\theta) = -5/4$, then we also know that

(a) $\cos(\theta) = -4/5$ (b) $\sin(\theta) = -4/5$

(c) $\tan(\theta) = 5/4$ (d) $\cot(\theta) = 5/4$

(21) _____ Let f be a function defined at $x = a$ and $x = b$. The average rate of change for f between $x = a$ and $x = b$ is

(a) $\frac{f(a) - f(b)}{b - a}$ (b) $\frac{f(b) - f(a)}{b - a}$

(c) $\frac{f(a + b) - f(b)}{a - b}$ (d) $\frac{f(b) - f(b - a)}{a}$

(22) _____ The inverse of the function $f(x) = 7x + 8$ will be

(a) $g(x) = (x - 8)/7$ (b) $g(x) = 1/(7x + 8)$

(c) $g(x) = 8/(x - 7)$ (d) $g(x) = -7x - 8$

(23) _____ If $\sin(A) < 0$ and $\tan(A) < 0$, then

(a) $\cos(A) = -\sqrt{1 - \sin^2(A)}$ (b) $\cos(A) = \sqrt{1 - \sin^2(A)}$

(c) $\cos(A) = \sqrt{\sin^2(A) - 1}$ (d) $\cos(A) = -\sqrt{\sin^2(A) - 1}$

Problems 24-26 refer to the following function.

$$f(x) = \begin{cases} 3 & \text{if } x < 2 \\ x - 1 & \text{if } 2 < x \leq 4 \\ 2x - 5 & \text{if } 4 < x \end{cases}$$

(24) _____ The value of $f(0)$ is

(a) undefined (b) 3

(c) 0 (d) -1

(25) _____ The value of $f(2)$ is

(a) undefined (b) 3

(c) 1 (d) -1

(26) _____ The formula $x - 1$ is valid on the interval

(a) $[2, 4)$ (b) $[2, 4]$

(c) $(2, 4)$ (d) $(2, 4]$

(27) _____ If a function f is symmetric with respect to the y-axis and (a, b) lies on the graph of f, then

(a) $(a, -b)$ lies on the graph of f. (b) $(-b, a)$ lies on the graph of f.

(c) $(-a, -b)$ lies on the graph of f. (d) $(-a, b)$ lies on the graph of f.

(28) _____ If $f(x) = \sqrt{x}$ and $g(x) = x^2$, then $(gf)(x)$ is equal to

(a) $\sqrt{x}/x$ (b) $|x|$

(c) $x^2\sqrt{x}$ (d) x

(29) _____ If $f(x) = (x-a)^3(x-b)^2$, then the graph of f will

(a) cross the x-axis only at $x = b$. (b) cross the x-axis only at $x = a$.

(c) touch the x-axis only at $x = a$. (d) touch the y-axis only at $x = b$.

Problems 30-33 refer to the function $f(x) = 2 + \cos\left[3x - \frac{\pi}{2}\right]$.

(30) _____ The period of the function f is

(a) 2π (b) 3

(c) $2\pi/3$ (d) 2

(31) _____ Compared to the basic cosine function, the horizontal translation of f is

(a) $\pi/2$ units right. (b) $\pi/6$ units right.

(c) 2 units left. (d) 3 units left.

(32) _____ The amplitude of the function f is

(a) π. (b) 3.

(c) 2. (d) 1.

(33) _____ In an interval of width 2π, the function f will complete

(a) three oscillations. (b) two oscillations.

(c) one oscillation. (d) π oscillations.

(34) _____ If $f(x) = x^2 - 3$, then $(f \circ f)(2)$ is equal to

(a) 1 (b) -2

(c) $2(x^2-3)^2$ (d) $2(x^2-3)^2 - 6$

(35) _____ The maximum value of $f(x) = -3 + 4\cos(2x + \pi)$ is

(a) -3. (b) 2.

(c) 1. (d) 4.

(36) _____ If $f(x) = 3(x-a)^2(x-b)(x-c)$ then the graph of f must have

(a) no turning points (b) exactly one turning point

(c) exactly two turning points (d) exactly three turning points

(37) _____ The reference angle for $\theta = 330°$ is

(a) $A = -60°$ (b) $A = 150°$

(c) $A = 60°$ (d) $A = 30°$

(38) _____ The laws of logarithms tells us that $\log(x-1) - \log(x-2)$ is equal to

(a) $\dfrac{x-1}{x-2}$ (b) $\dfrac{\log(x-1)}{\log(x-2)}$

(c) $\log\left[\dfrac{x-1}{x-2}\right]$ (d) $-\log[(x-1)(x-2)]$

(39) _____ A tire of radius three feet rolls along the ground at an angular speed of 4 radians per second. In six seconds, the tire will roll

(a) 72 feet (b) 12 feet

(c) 36π feet (d) 24π feet

(40) _____ If the point $(3, 2)$ lies on the graph of $f(x) = \log_a(x)$, then we know

(a) $a^2 = 3$ (b) $a^3 = 2$

(c) $3^a = 2$ (d) $a = 3/2$

(41) _____ Let θ be an angle in standard position and suppose (a, b) is a point on the terminal side of θ a positive distance r from the origin. We know that

(a) $\cot(\theta) = y/x$ (b) $\sec(\theta) = x/r$

(c) $\tan(\theta) = x/y$ (d) $\csc(\theta) = r/y$

(42) _____ A tire rolls 4π feet when it is rotated through an angle of $240°$. The radius of the tire is

(a) $\pi/5$ feet (b) $4/\pi$ feet

(c) 3 feet (d) 4 feet

(43) _____ If we know θ lies in Quadrant IV, then which of the following statements is correct?

(a) $\sin(\theta) = \sqrt{1-\cos^2(\theta)}$ (b) $\sin(\theta) = -\sqrt{1-\cos^2(\theta)}$

(c) $\cos(\theta) = 1 - \sin(\theta)$ (d) $\cos^2(\theta) = \sin^2(\theta) - 1$

(44) _____ We know that $\log_4(10)$ is approximately

(a) 0.602 (b) 1.661

(c) 2.303 (d) 1.386

(45) _____ If we know θ lies in Quadrant II and $\cos(\theta) = -3/5$, then we also know that $\sin(\theta)$ is equal to

(a) $4/5$ (b) $-4/5$

(c) $1/3$ (d) $3/5$

(46) _____ The equation $\log(2x-5) = 8$ is equivalent to

(a) $2x - 5 = e^8$ (b) $2x - 5 = 8$

(c) $e^{2x-5} = e^8$ (d) $2x - 5 = 10^8$

(47) _____ We have $\ln[(1-2x)^2] = 2\ln(1-2x)$

(a) for $x < 1/2$. (b) for all x.

(c) for $x \neq 1/2$. (d) for $x > 0$.

(48) _____ If $f(x) = x^2 - 1$, then the formula which gives the average rate of change for f on the interval $a \le x \le a + h$ is

(a) $y = a$ (b) $y = \dfrac{a^2 - 1}{h}$

(c) $y = 2a + h$ (d) $y = \dfrac{2h - a^2}{a}$

(49) _____ If we write $y = \ln(x\sqrt{x^2 - 1})$ as a sum of natural logs, we obtain

(a) $\ln(x) + \ln(x) - \ln(1)$ (b) $\ln(x) + (1/2)\ln(x - 1)$

(c) $\ln(x) + (1/2)\ln(x + 1) + (1/2)\ln(x - 1)$ (d) $(1/2)\ln(x) + \ln(x) + (1/2)\ln(-1)$.

(50) _____ If $f(x) = 5 + 3\cos[4(x - 1)]$ and a is any real number, then which of the following must equal $f(a)$?

(a) $f(a + 3\pi/2)$ (b) $f(a + \pi/4)$

(c) $f(a + 8)$ (d) $f(a - 4)$

(51) _____ The terminal side of $\theta = 23\pi/3$ lies in

(a) Quadrant I (b) Quadrant II

(c) Quadrant III (d) Quadrant IV

(52) _____ The method for solving $\log_2(x) + \log_2(x + 1) = 1$ yields two possible solutions, namely $x = 1$ and $x = -2$. From this, we know

(a) both $x = 1$ and $x = -2$ are solutions. (b) only $x = 1$ is a solution.

(c) only $x = -2$ is a solution. (d) neither $x = 1$ nor $x = -2$ is a solution.

(53) _____ The function $f(x) = \dfrac{5x^2 - 3x + 1}{x - 3}$ has slant asymptote

(a) $y = 5x$ (b) $y = -3x$

(c) $y = 3$ (d) $y = 5x + 12$

(54) _____ Suppose an ant is sitting on the perimeter of the unit circle at the point (0,-1). If the ant travels a distance of $2\pi/3$ units in the clockwise direction, then the coordinates of the point where the ant stops will be

(a) $(\sqrt{3}/2, 1/2)$ (b) $(-1/2, \sqrt{3}/2)$

(c) $(1/2, \sqrt{3}/2)$ (d) $(-\sqrt{3}/2, -1/2)$

(55) _____ The function $y = \dfrac{x^2 - 1}{x^2 - x - 2}$ has a vertical asymptote

(a) at $x = -1$ and $x = 2$. (b) only at $x = 2$.

(c) only at $x = 1$. (d) only at $x = -1$.

(56) _____ The graph of the polynomial $f(x) = (x - a)^3(x - b)^2(x - c)$ will approach

(a) $+\infty$ as x moves left and right. (b) $-\infty$ as x moves left and right.

(c) $+\infty$ as x moves left and $-\infty$ as x moves right. (d) $-\infty$ as x moves left and $+\infty$ as x moves right.

(57) _____ Suppose you deposit $\$1,000$ into an account which pays 4% annual interest, compounded quarterly. Approximately how long will it take for the amount of money in the account to double?

(a) About 25 years
(b) About 17.4 years
(c) About 17.3 years
(d) About 25.2 years

(58) _____ If we were to graph the function $y = 3x2-1$ on the interval $-1 < x \leq 2$, then we would

(a) place an open circle at $(-1, 2)$ and at $(2, 11)$
(b) place a closed circle at $(-1, 2)$ and at $(2, 11)$
(c) place a closed circle at $(-1, 2)$ and an open circle at $(2, 11)$
(d) place an open circle at $(-1, 2)$ and a closed circle at $(2, 11)$

(59) _____ The vertex of the parabola $y = 2x^2 - 8x + 9$ is the point

(a) $(2, 1)$
(b) $(-1, -2)$
(c) $(1/2, -1)$
(d) $(1, 2)$

(60) _____ If $f(x) = 5x + 4$, then the inverse of f will

(a) subtract 4 from its input, then divide by 5.
(b) divide its input by 5, then subtract 4.
(c) divide its input by 4, then subtract 5.
(d) subtract 5 from its input, then divide by 4.

Answers

(1) C	(2) D	(3) D	(4) A
(5) B	(6) A	(7) B	(8) B
(9) A	(10) A	(11) C	(12) A
(13) D	(14) B	(15) C	(16) D
(17) A	(18) C	(19) A	(20) A
(21) B	(22) A	(23) B	(24) A
(25) A	(26) D	(27) D	(28) C
(29) B	(30) C	(31) B	(32) D
(33) A	(34) B	(35) C	(36) D
(37) D	(38) C	(39) A	(40) A
(41) D	(42) C	(43) B	(44) B
(45) A	(46) D	(47) A	(48) C
(49) C	(50) A	(51) D	(52) B
(53) D	(54) B	(55) B	(56) A
(57) B	(58) D	(59) A	(60) A

Are you ready for university

Calculus?

Take the Test

The U1 Student Help Centre and the Department of Mathematics

The Test

Even though you must have a minimum of 60% in Math 40S Pre-calculus in order to enrol in introductory university calculus courses, many students who meet this prerequisite find themselves under prepared and have difficulty with the course.

This self-scored test is designed by the Department of Mathematics for you to assess your readiness for the introductory calculus courses 136.150, 136.151, 136.152, 136.168, and 136.169. If you intend to register in any of these courses, you should take this test and score it yourself using the Answer Key provided (see back of sheet).

Scoring

Be honest! If you peek at the answers, your performance on this test will not tell you if you are prepared for university calculus. The test is divided into five parts. A score of less than 3 out of 5 for any part indicates a weakness in that particular area. Depending on your overall score and how many areas you are weak in, you may want to consider taking a remedial math course or registering in a Developmental section of a calculus course. If your overall score is below 60%, you should consider upgrading your skills by taking *Mathematical Skills*, a non-credit course offered by Continuing Education, prior to taking introductory calculus.

Mathematical Skills

You will learn to apply mathematical skills to both elementary and computationally complicated situations, consistently and with confidence. Class format includes a review of fundamental concepts, demonstrations, problem solving, applications and regular testing, including a final examination.

Fall courses start early in September and are taught on Mondays and Wednesdays or Tuesdays and Thursdays in the evenings from 7:00 – 9:00 p.m.

Registration for this course is **not** done through UMREG.

For Registration Information call 474-8016

For Program Information call 474-6661 or 474-6680
or toll free in Manitoba 1-888-216-7011 ext. 6661

Apply early as enrolment is limited.

Developmental sections in calculus courses

Developmental sections are offered in calculus courses 136.150 and 136.152. Check the *Registration Guide* for details. Students in these sections will receive an extra hour of teaching each week. Students will learn the same material as in other sections and will write the same mid-term and final examination.

Developmental sections in algebra courses

A developmental section is also available in 136.131 - Matrices for Management and Social Sciences. Check the *Registration Guide* for details.

The Math Help Centre

The Math Help Centre, in Room 318 Machray Hall, is open during the regular session. Senior math students can assist you in understanding concepts and specific problems you may be having difficulty with in your calculus course.

Are you ready for university Calculus?

PART A – ALGEBRAIC MANIPULATION

Simplify the expressions (1) through (4):

1. $x(2x+3(x-(2x+1)))$

2. $\dfrac{x+\dfrac{1}{y}}{y+\dfrac{1}{x}}$

3. $\left(x+\frac{1}{3}y\right)\left(\frac{1}{4}x-y\right)-\left(\frac{2}{3}x-y\right)\left(x-\frac{3}{2}y\right)$

4. $\dfrac{\left(9x^2+3x-2\right)}{\left(9x^2-1\right)}\bullet\dfrac{\left(3x^2+13x+4\right)}{\left(27x^3+8\right)}$

5. **Rationalize the denominator and simplify** $\dfrac{\sqrt{x}}{\sqrt{x}+3}$

PART B - SOLVING EQUATIONS

Solve the following equations for x.

6. $1-\dfrac{3}{x}=\dfrac{4}{5}$

7. $x^4-13x^2+36=0$

8. $x^3-4x^2+x+6=0$

9. $\dfrac{x+1}{3x-1}+\dfrac{2x+1}{3x-2}=-1$

10. $\sqrt{x+1}+\sqrt{x+8}=\sqrt{5x+9}$

PART C – FUNCTIONS AND GRAPHS

11. **If** $f(x)=\dfrac{x}{1-x}$, **find** $f\left(\dfrac{1}{x}\right)$

12. **If** $f(x)=3x+2$ **and** $g(x)=2-x$, **find** $f(g(x))$

13. **If** $f(x)=\dfrac{x}{1+x}$, **find** $f(x-1)$

14. **Sketch the graph of** $y=x^2-2x$

15. **Sketch the graph of** $y=x+\dfrac{1}{x}$

PART D – EXPONENTS AND LOGARITHMS

Simplify expressions (16) and (17):

16. $\left(3a^2b\right)^2\left(2ab^4\right)^3\div\left(ab^2\right)^3$

17. $\left(x^{1/2}+y^{1/3}\right)\bullet\left(x^{1/3}-y^{1/2}\right)$

18. **Solve for x:** $\log_3(x-1)=2$

19. **Solve for x:** $3^x\cdot 3^{x+1}=9$

20. **Evaluate** $2\log_2 4+\dfrac{1}{2}\log_2 5-\dfrac{1}{2}\log_2 20$

PART E – TRIGONOMETRY

21. **If** $0<\theta<\dfrac{\pi}{2}$ **and** $\sin\theta=\dfrac{12}{13}$, **then find** $\cos\theta$

22. **If** $\dfrac{\pi}{2}<\theta<\pi$ **and** $\sin\theta=\dfrac{5}{13}$, **then** $\cos\theta=$?

23. $\sin\dfrac{7\pi}{6}=$ **?**

24. **Find all** θ **for which** $\cos 2\theta=-\dfrac{1}{2}$

25. **Find all** θ **for which** $2\sin^2\theta-\cos\theta=1$

Part A: **1.** $-x^2-3x$ **2.** $\frac{x}{y}$ **3.** $-\frac{5}{12}x^2+\frac{13}{12}xy-\frac{11}{6}y^2$

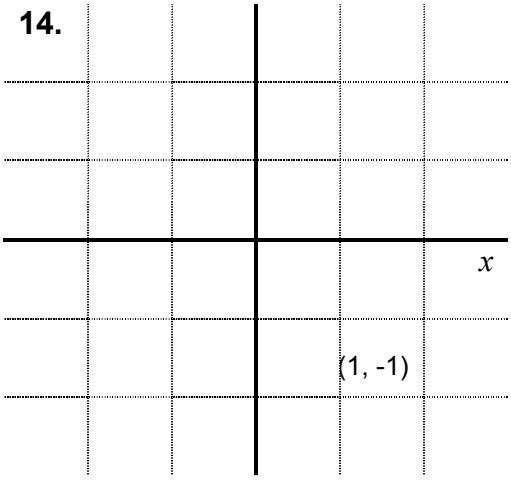
4. $\frac{x+4}{9x^2-6x+4}$ **5.** $\frac{x-3\sqrt{x}}{x-9}$ **Part A Score_____/ 5**

Part B: **6.** 15 **7.** ± 2, ± 3 **8.** –1, 2, 3

9. $-\frac{1}{9}, \frac{1}{2}$ **10.** 8 **Part B Score_____/ 5**

Part C: **11.** $\frac{1}{x-1}$ **12.** $8-3x$ **13.** $\frac{x-1}{x}$

14.



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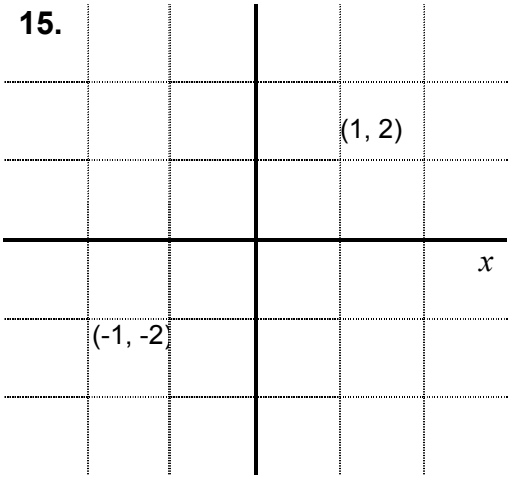


Part C Score_____/ 5

Part D: **16.** $72a^4b^8$ **17.** $x^{5/6}-x^{1/2}y^{1/2}+x^{1/3}y^{1/3}-y^{5/6}$ **18.** 10

19. $\frac{1}{2}$ **20.** 3 **Part D Score_____/ 5**

Part E: **21.** $\frac{5}{13}$ **22.** $-\frac{12}{13}$ **23.** $-\frac{1}{2}$

24. $\frac{\pi}{3}+n\pi$, $\frac{2\pi}{3}+n\pi$
(where *n* is an integer)

25. $\frac{\pi}{3}+2n\pi$, $\frac{5\pi}{3}+2n\pi$, $\pi+2n\pi$
(where *n* is an integer

Part E Score_____/ 5

Total Score _____/25

Name:_____ Summer Review 4 calc AB
Graphing Calculator Allowed

1. If $f(x)=-x^2+x,$ which of the following will calculate the derivative of f(x)?

a) $\lim_{h\to 0}\frac{\left(-x^2+x+h\right)-\left(-x^2+x\right)}{h}$ b) $\lim_{h\to 0}\frac{\left[-(x+h)^2+(x+h)\right]-\left(-x^2+x\right)}{h}$

c) $\frac{\left[-(x+h)^2+(x+h)\right]-\left(-x^2+x\right)}{h}$ d) $\frac{\left(-x^2+x+h\right)-\left(-x^2+x\right)}{h}$

e) none of these

2. Convert from rectangular to polar coordinates: $\left(5\sqrt{2},-5\sqrt{2}\right)$

a) $\left(-10,\frac{\pi}{4}\right)$ b) $\left(2\sqrt{5},\frac{7\pi}{4}\right)$ c) $\left(10,\frac{7\pi}{4}\right)$ d) $\left(10\sqrt{2},\frac{7\pi}{4}\right)$ e) none of these

3. Find the common ratio of the sequence. The sixth and ninth terms of a geometric sequence are 12 and 324 respectively.

a) 81/3 b) $\frac{9}{\sqrt{3}}$ c) 3 d) 1/3 e) none of these

4. Determine the seating capacity of an auditorium with 25 rows of seats if there are 20 seats in the first row, 24 seats in the second row, 28 seats in the third row, and so on.

a) 1200 b) 1500 c) 1700 d) 1900 e) none of these

5. Use sigma notation to write the sum: $\frac{2}{3}+\frac{4}{4}-\frac{6}{5}+\frac{8}{6}-...+\frac{16}{10}$

a) $\sum_{n=1}^{8}\frac{2n}{n+2}$ b) $\sum_{n=2}^{8}\frac{n+2}{n+1}$ c) $\sum_{n=0}^{6}\frac{n+2}{n+3}$ d) $\sum_{n=3}^{9}\frac{n-1}{n}$ e) none of these

6. Given a triangle with a = 12, c = 21, and B = 72˚, find C.

a) 69.2˚ b) 74.6˚ c) 81˚ d) 33.4˚ e) none of these

7. Find the sum of the infinite geometric sequence: $3,1,\frac{1}{3},\frac{1}{9},\frac{1}{27},...$

a) $\frac{3}{2}$ b) $\frac{9}{2}$ c) $\frac{5}{3}$ d) 3 e) none of these

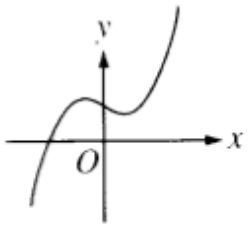
8. Given a triangle with a = 146, b = 148, and A = 78˚, find B. If there are two solutions, find both.

a) 82.5˚ b) 4.5˚, 19.5˚ c) No solution d) 82.5˚, 97.5 e) none of these

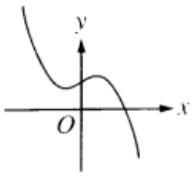
9. Ship A is 73 miles from a lighthouse on the shore. Its bearing form the lighthouse is N 15˚ E. Ship B is 80 miles from the same lighthouse. Its bearing from the lighthouse is N 52˚ E. Find the number of miles between the two ships.

a) 84.57 b) 44.44 c) 49.29 d) 90.75 e) none of these

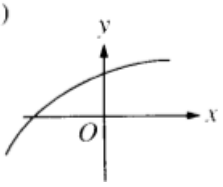
10. The graph of h(x) is shown. Which could be the graph of $h'(x)$?



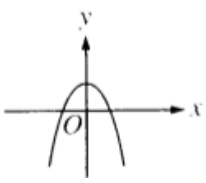
(A)



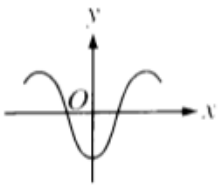
(B)



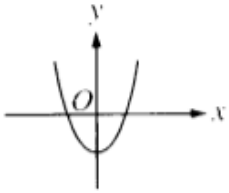
(C)



(D)



(E)



11. Find the slope of the graph of $f(x) = x^2 - 2x$ at the point $(a, f(a))$.

a) 0 b) f(a) c) $2a - 2$ d) $a^2 - 2a$ e) none of these

12. Find all solutions in the interval [0, 2π): $\tan^2 x = \sec x + 1$.

a) $\frac{\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{3\pi}{2}$ b) $\frac{\pi}{3}, \pi, \frac{5\pi}{3}$ c) $\frac{2\pi}{3}, \frac{4\pi}{3}$ d) $\frac{\pi}{6}, \pi, \frac{11\pi}{6}$ e) none of these

13. Use Pascal's Triangle to expand $(x + 3y)^3$.

a) $x^3 + 6x^2y + 6xy^2 + 9y^3$ b) $x^3 - 3x^2y + 6xy^2 - 27y^3$

c) $x^3 + 9x^2y + 27xy^2 + 27y^3$ d) $x^3 + 9x^2y + 9xy^2 + 3y^3$

e) none of these

14. Determine the coefficient of x^5y^7 in the expansion of $(5x + 2y)^{12}$.

a) 316,800,000 b) 400,000 c) 792 d) 7920 e) none of these

15. Find the limit if it exists: $\lim_{x \to \infty} \frac{3x^2 - 2}{(2x + 1)^2}$.

a) 1.5 b) 0.75 c) -2 d) DNE e) none of these

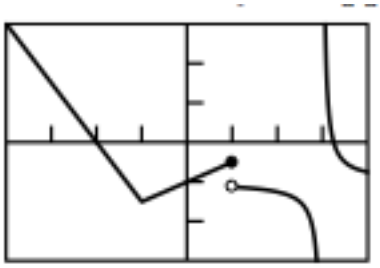
No Calculator

16. The graph of f(x) is shown. At what values of x does f(x) appear to have a limit of DNE?

a) x = 1 b) x = -1, x = 1

c) x = -1, x = 3 d) x = 1, x = 3

e) none of these



[–4, 4] by [–3, 3]

17. Find all solutions in the interval [0, 2π): $\cos x = \frac{1}{4\cos x}$.

a) $\frac{\pi}{6}, \frac{5\pi}{6}$ b) $\frac{\pi}{3}, \frac{2\pi}{3}$ c) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ d) $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$ e) none of these

18. Find the limit if it exists: $\lim_{x\to\infty}\left[2+\frac{x+1}{5-2x}\right]$.

a) 2 b) $\frac{11}{5}$ c) 1.5 d) DNE e) none of these

19. Simplify: $\sin\left(x-\frac{\pi}{6}\right)$.

a) $\frac{\sqrt{3}}{2}\sin x - \frac{1}{2}\cos x$ b) $\frac{\sqrt{3}}{2}\sin x + \frac{1}{2}\cos x$ c) $\sin x - \frac{1}{2}$

d) $\frac{1}{2}\sin x + \frac{\sqrt{3}}{2}\cos x$ e) none of these

20. Find $\lim_{x\to 0}\frac{\sqrt{x+9}-3}{x}$.

a) 0 b) 1 c) ∞ d) 1/3 e) none of these

21. Find $\lim_{x\to -4}\frac{x^2+11x+28}{x+4}$.

a) 7 b) 3 c) 0 d) DNE e) none of these

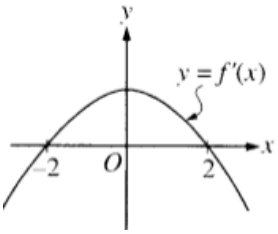
22. Find the derivative of the function at the specified point. $f(x)=\frac{6}{5-x}$ at x = 3

a) 3 b) 3/2 c) -3 d) 6 e) none of these

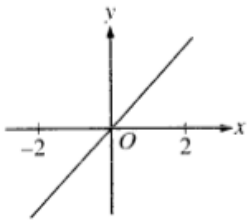
23. Find the limit of the function. $\lim_{x\to -2}\left(-x^2 - x\right)^3$.

a) 6 b) 8 c) -6 d) 0 e) none of these

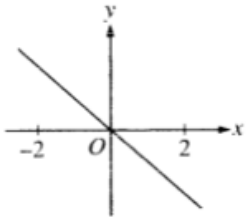
24. The graph of the <u>derivative</u> of f is shown. Which could be the graph of f.



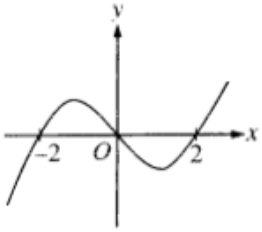
(A)



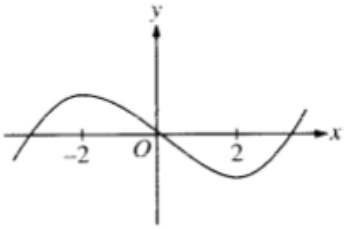
(B)



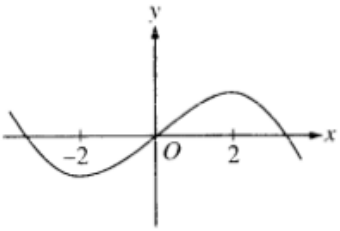
(C)

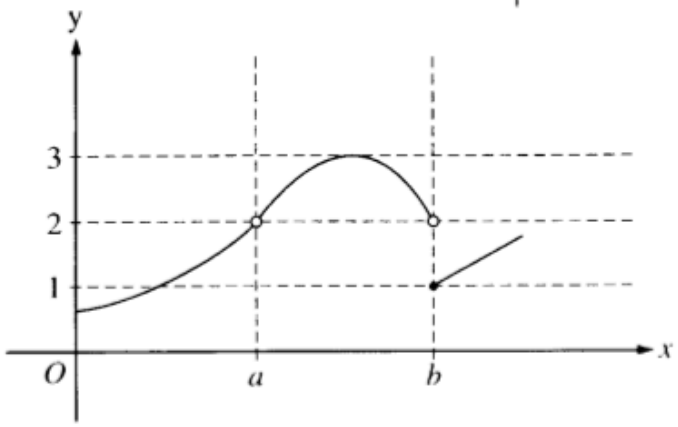


(D)



(E)





25. The graph of the function f is shown in the figure above. Which of the following statements about f is true?

(A) $\lim_{x\to a} f(x) = \lim_{x\to b} f(x)$

(B) $\lim_{x\to a} f(x) = 2$

(C) $\lim_{x\to b} f(x) = 2$

(D) $\lim_{x\to b} f(x) = 1$

(E) $\lim_{x\to a} f(x)$ does not exist.