Greater Atlanta Christian School

Honors Analysis Summer Assignment

PRECALCULUS REVIEW PROBLEMS

(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) D	(55) B	(56) A
(57) B	(58) D	(59) A	(60) 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** $\dfrac{\sqrt{x}}{\sqrt{x}+3}$

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

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** $y=x+\dfrac{1}{x}$

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

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.** $-\frac{5}{12}x^2+\frac{13}{12}xy-\frac{11}{6}y^2$

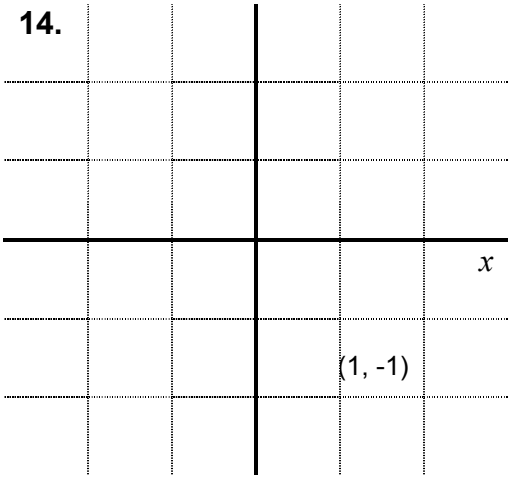
4. $\frac{x+4}{9x^2-6x+4}$ **5.** $\frac{x-3\sqrt{x}}{x-9}$ **Part A Score_____/ 5**

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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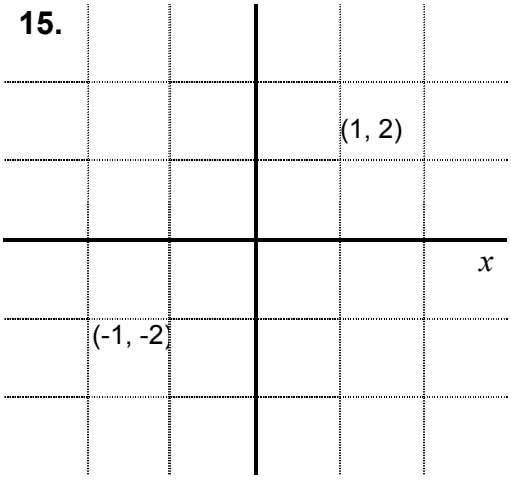


Part C Score_____/ 5

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

Summer Review 3

Without the graphing capabilities of your graphing calculator

1. If $f(x) = \frac{1}{2}x$, find $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$.

   a) 2 b) $\frac{1}{2}$ c) $\frac{x + \frac{1}{2}h}{h}$ d) 1 e) None of these

2. Match the function with the graph.

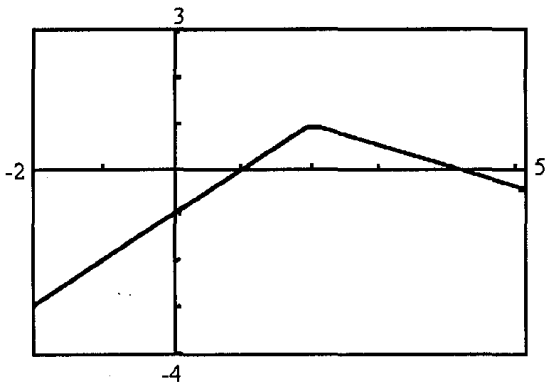
   a) $f(x) = \begin{cases} x - 1, & x \leq 2 \\ -2x + 4, & x > 2 \end{cases}$

   b) $f(x) = \begin{cases} x - 1, & x \leq 2 \\ -1/2x + 2, & x > 2 \end{cases}$

   c) $f(x) = \begin{cases} -x + 1, & x \leq 2 \\ x + 4, & x > 2 \end{cases}$

   d) $f(x) = \begin{cases} -x - 1, & x \leq 2 \\ -2x + 8, & x > 2 \end{cases}$

   e) None of these



3. Find an equation of the function whose graph is a horizontal shift 9 units to the right and a vertical stretch (by 4) of the graph of $f(x) = \sqrt[3]{x}$.

   a) $g(x) = \frac{1}{4}\sqrt[3]{x + 9}$ b) $g(x) = \frac{1}{4}\sqrt[3]{x - 9}$ c) $g(x) = 4\sqrt[3]{x - 9}$

   d) $g(x) = 4\sqrt[3]{x + 9}$ e) None of these

4. Given $f(x) = x - 2$ and $g(x) = 6 - 2x$, find $(f + g)(-2)$.

   a) 6 b) 2 c) -2 d) -14 e) None of these

5. Given $f(x) = \sqrt{x}$ and $g(x) = x^2 + 4$, find the domain of $(f \circ g)(x)$.

   a) $(-\infty, 0]$ b) $[0, \infty)$ c) $(-\infty, \infty)$

   d) $(-\infty, -2)(-2, 2)$ e) None of these

6. Find a polynomial function with zeros: 1, 0, -3.

a) $f(x) = x(x - 3)^3(x + 1)^2$ b) $f(x) = x^2(x - 1)(x + 3)$

c) $f(x) = x(x - 3)(x - 1)$ d) $f(x) = (x - 1)(x + 3)^2$

e) None of these

7. Divide, then write your answer in standard form: $\dfrac{-4 + i}{1 + 4i}$.

a) $-\dfrac{8}{17} + i$ b) $-i$ c) i d) $\dfrac{8}{17} - i$ e) None of these

8. Find a fourth degree polynomial with real coefficients that has zeros: 1, -3, $2i$.

a) $x^4 - 2x^3 + x^2 - 8x - 12$ b) $x^4 + 2x^3 - 7x^2 - 8x + 12$

c) $x^4 + 2x^3 + x^2 + 8x - 12$ d) $x^4 - 2x^3 - 7x^2 + 8x - 12$

e) None of these

9. Find the slant asymptote: $f(x) = \dfrac{x^2 + 3x + 1}{x + 1}$.

a) $x = -1$ b) $y = x + 3$ c) $y = x + 2$

d) $y = 0$ e) None of these

10. Given $\sin\theta = \dfrac{7}{13}$, and $\tan\theta < 0$, find $\tan\theta$.

a) $-\dfrac{7\sqrt{3}}{2}$ b) $-\dfrac{2\sqrt{3}}{7}$ c) $-\dfrac{2\sqrt{3}}{13}$ d) $-\dfrac{7\sqrt{30}}{60}$ e) None of these

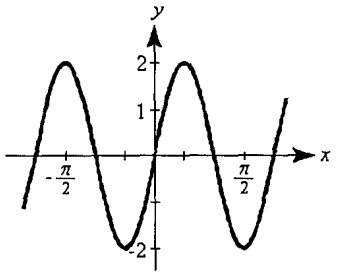
11. Determine the period: $f(x) = -\dfrac{1}{2}\sin\left[\dfrac{3x}{2} - \dfrac{1}{2}\right]$.

a) $\dfrac{1}{2}$ b) $\dfrac{1}{2\pi}$ c) $\dfrac{3\pi}{4}$ d) $\dfrac{4\pi}{3}$ e) None of these

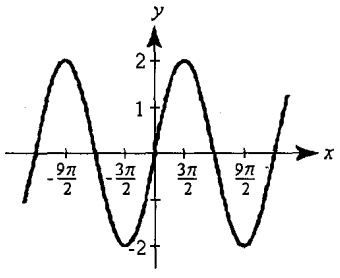
12. Sketch the graph: $f(x) = 2\sin 3x$.

a) I b) II c) III d) IV e) None of these

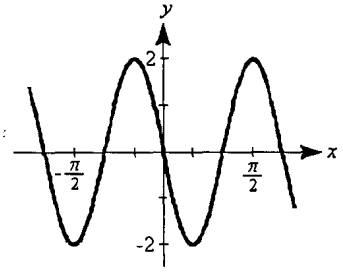
(I)



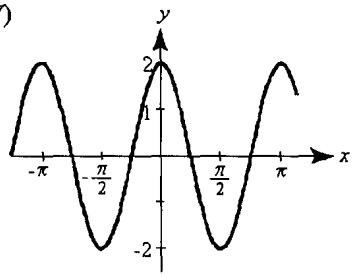
(II)



(III)



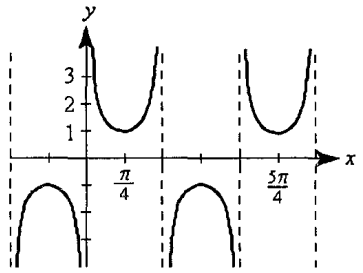
(IV)



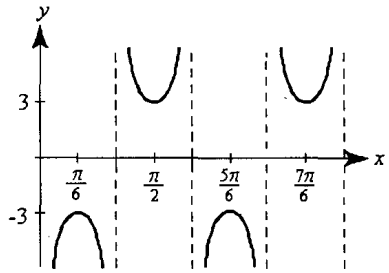
13. Match the correct graph with the function: $f(x) = \csc 3x$.

a) I b) II c) III d) IV e) None of these

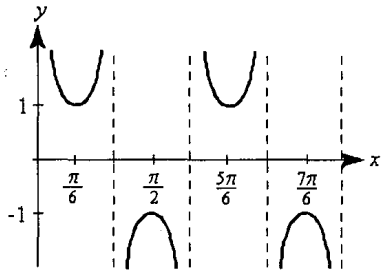
(I)



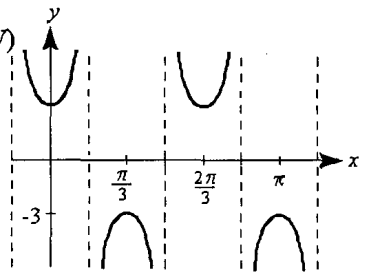
(II)



(III)



(IV)



14. Give the exact value of $\tan \frac{15\pi}{6}$.

a) $\frac{1}{\sqrt{3}}$ b) $\frac{1}{\sqrt{2}}$ c) $\sqrt{3}$ d) 1 e) None of these

15. Evaluate: $\arcsin\left[-\frac{1}{2}\right]$.

a) $-\frac{\pi}{6}$ b) $\frac{11\pi}{6}$ c) $\frac{5\pi}{6}$ d) $\frac{\pi}{6}$ e) None of these

16. Evaluate: $\cos\left[\arctan\left[-\frac{2}{3}\right]\right]$.

a) $3\sqrt{13}$ b) $\frac{3\sqrt{13}}{13}$ c) $-\frac{2\sqrt{13}}{13}$ d) $\frac{2\sqrt{13}}{13}$ e) None of these

17. Find all solutions in the interval $[0, 2\pi)$: $\sec^2 x = \sec x + 2$.

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

18. Find all solutions in the interval $[0, 2\pi)$: $6\cos^2 x - 5\sin x - 2 = 0$.

a) $-1.3333, -4.4749, \frac{\pi}{6}, \frac{5\pi}{6}$ b) $\frac{\pi}{6}, \frac{5\pi}{6}$ c) 2.0000, 5.1416

d) $\frac{7\pi}{6}, \frac{11\pi}{6}$ e) None of these

With the graphing capabilities of your graphing calculator:

19. Determine whether the function $f(x) = \frac{7}{x + 2}$ is one-to-one. If it is, find its inverse.

a) Not one-to-one b) $f^{-1}(x) = \frac{x + 2}{7}$ c) $f^{-1}(x) = \frac{7 - 2x}{x}$

d) $f^{-1}(x) = -\frac{7}{x + 2}$ e) None of these

20. Write as a product of linear factors: $f(x) = x^4 - 5x^3 + 8x^2 - 20x + 16$.

a) $(x + 2)(x - 2)(x - 4)(x - 1)$ b) $(x + 4)(x + 1)(x - 2i)(x + 2i)$
c) $(x - 4)(x - 1)(x + 2i)(x - 2i)$ d) $(x + 4)(x + 1)(x + 2i)(x + 2i)$
e) None of these

21. Which of the following equations is not true?

a) $b^{\log_b c} = c$ b) $\log_1 b = b$ c) $\log_b b = 1$
d) All of these equations are false.
e) All of these equations are true.

22. Solve for x: $3^{5x+1} = 5$.

a) 0.1022 b) 0.0930 c) 0.1333 d) 0.2218 e) None of these

23. Solve for x: $\log(3x + 7) + \log(x - 2) = 1$.

a) $\frac{8}{3}$ b) $3, -\frac{8}{3}$ c) 2 d) $2, -\frac{5}{3}$ e) None of these

24. Find the balance B after 10 years if \$1500 is invested in an account that pays $7\frac{1}{2}\%$ interest compounded monthly.

a) \$3153.52 b) \$4151.16 c) \$2625.00
d) \$2997.10 e) None of these

25. The spread of a flu virus through a certain population is modeled by

$$y = \frac{1000}{1 + 990e^{-0.7t}},$$

where y is the total number infected after t days. In how many days will 900 people be infected with the virus?

a) 11 days b) 13 days c) 15 days d) 17 days e) None of these

26. Simplify: $\frac{\csc x}{\tan x + \cot x}$.

a) $\cos x + \tan x$ b) $\sin^2 + \cos x$ c) $\csc^2 x \sec$
d) $\cos x$ e) None of these

Answers

1. B
2. B
3. C
4. A
5. C
6. B
7. C
8. C
9. C
10. D
11. D
12. A
13. C
14. E
15. A
16. B
17. B
18. E
19. C
20. C
21. B
22. B
23. A
24. E
25. B
26. D

Completed Packet is due on the first day of math class