Name: Key Class: _____ Date: 2011 ID: A

Pre-Calculus 2nd Semester Study Guide

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

B 1. Change 1.96 radians to degree measure. Round to the nearest tenth. $1.96 \cdot \frac{180^\circ}{\pi}$
a. 472.3°
b. 112.3°
c. 292.3°
d. 202.3°

B 2. Change 290° to radian measure in terms of π. $290 \cdot \frac{\pi}{180}$
a. $\frac{29}{27}\pi$
b. $\frac{29}{18}\pi$
c. $\frac{29}{36}\pi$
d. $\frac{29}{9}\pi$

C 3. Find the area of a sector with a central angle of 32° and a radius of 8.5 millimeters. Round to the nearest tenth. $\frac{32}{360} \cdot \pi (8.5)^2$
a. $40.4\ \text{mm}^2$
b. $2.4\ \text{mm}^2$
c. $20.2\ \text{mm}^2$
d. $9.5\ \text{mm}^2$

P 4. A pulley of radius 10 cm turns at 6 revolutions per second. What is the linear velocity of the belt driving the pulley in meters per second? $\frac{6\ \text{Rev}}{\text{sec}} \cdot \frac{2\pi}{1\ \text{Rev}} \cdot \left(10\text{cm}, \frac{1\text{m}}{100\text{cm}}\right.$
a. 376.99 m/s
b. 1.67 m/s
c. 166.67 m/s
d. 3.77 m/s

B 5. Find the amplitude, period, and phase shift of $f(x) = -4\sin(7x + 2)$. $7\left(x + \frac{2}{7}\right)$
a. amplitude = –4
period = $\frac{2\pi}{7}$
phase shift = $\frac{2}{7}$
Amp = $|-4| = 4$
Period = $\frac{2\pi}{7}$
P.S. = $-2/7$
b. amplitude = 4
period = $\frac{2\pi}{7}$
phase shift = $-\frac{2}{7}$
c. amplitude = 8
period = $\frac{\pi}{7}$
phase shift = $-\frac{2}{7}$
d. amplitude = –4
period = 2π
phase shift = $\frac{2}{7}$

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6. Write an equation of the cosine function with amplitude 2 and period 4π.

a. $y = 2\cos\left(\frac{1}{2}x\right)$

b. $y = -2\cos\left(\frac{1}{4}x\right)$

c. $y = -\frac{1}{2}\cos\left(\frac{1}{2}x\right)$

d. $y = \frac{1}{2}\cos\left(\frac{1}{4}x\right)$

$\frac{2\pi}{4\pi} = \frac{1}{2} = B$

$2 = a$

B

7. Graph the function. Which choice gives the amplitude, period, phase shift, and vertical shift for the function?

$y = 4\cos\left(3\theta + \frac{3}{4}\pi\right) + 4$

$3(\theta + \frac{1}{4}\pi)$

$\frac{2\pi}{3}$

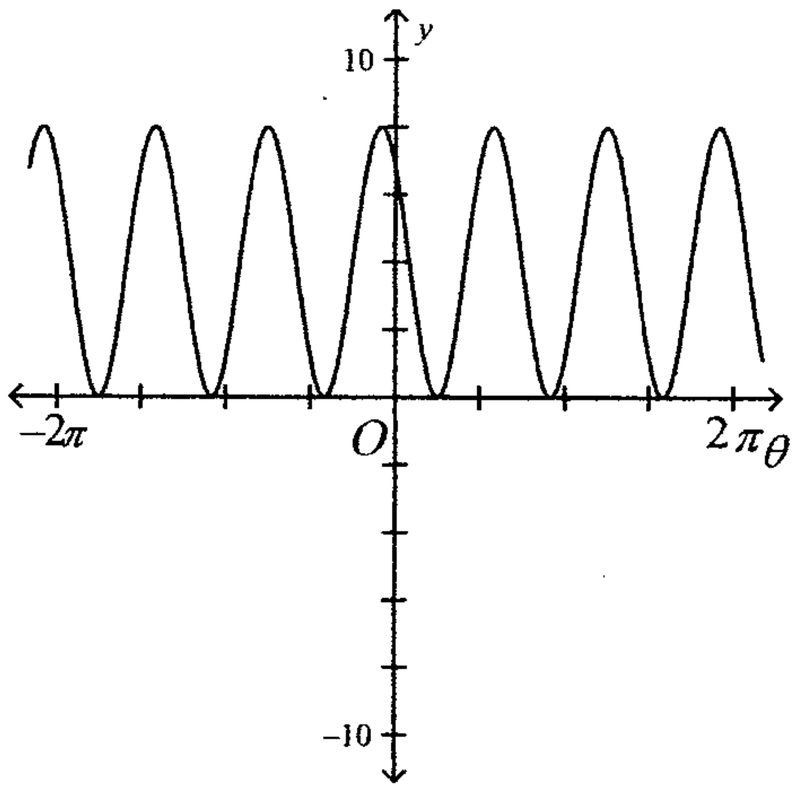
$A = 4$

$period = \frac{2\pi}{3}$

$PS = -\frac{1}{4}\pi$

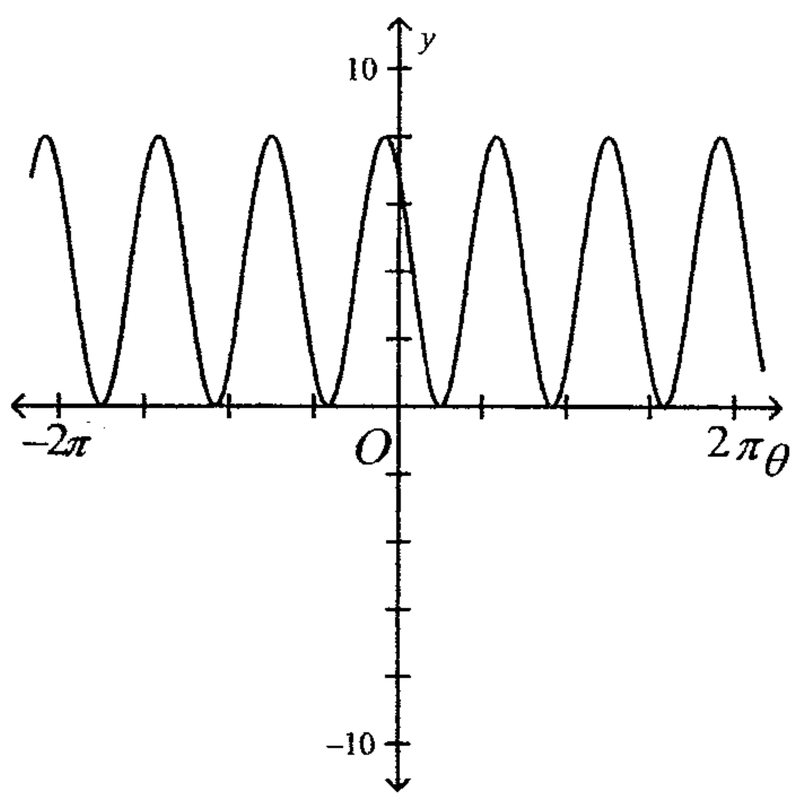
$VS = 4$

a.



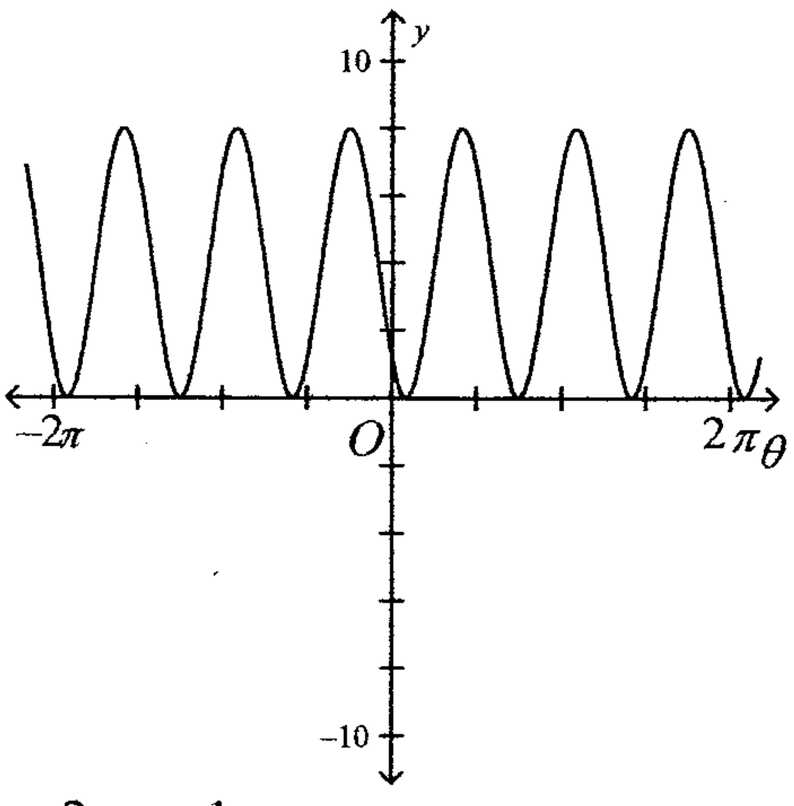
$4; \frac{2}{3}\pi; -\frac{1}{4}\pi; 4$

c.



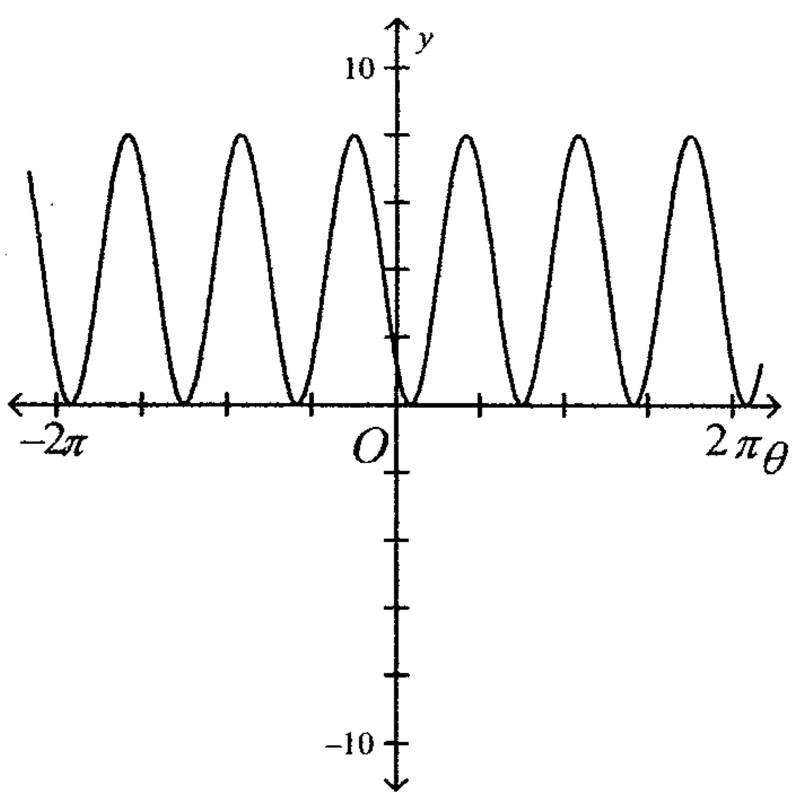
$-4; \frac{2}{3}\pi; -\frac{1}{4}\pi; 4$

b.



$4; \frac{2}{3}\pi; -\frac{1}{4}\pi; 4$

d.

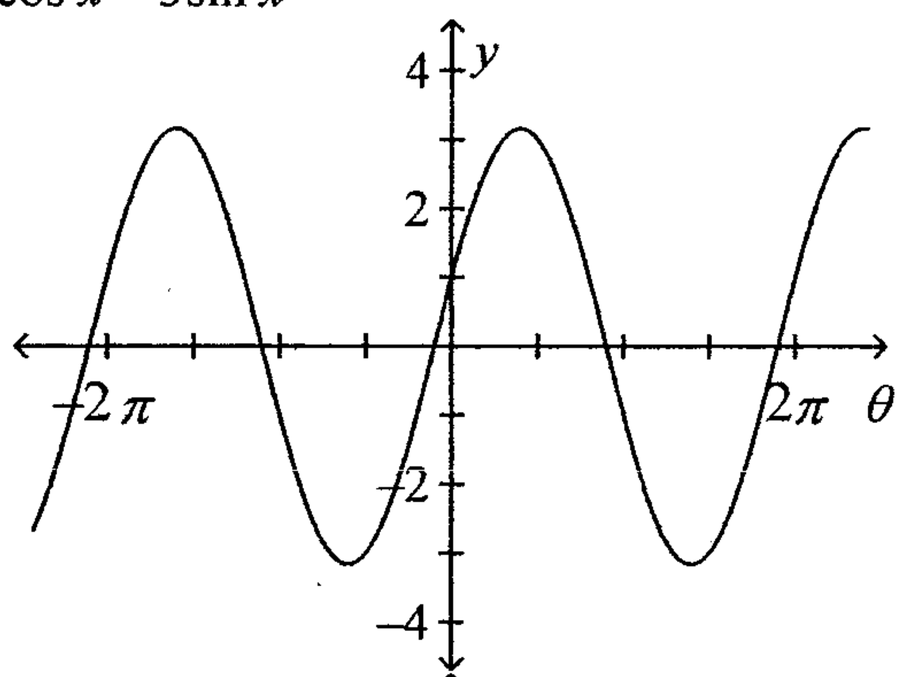


$-4; \frac{2}{3}\pi; -\frac{1}{4}\pi; -4$

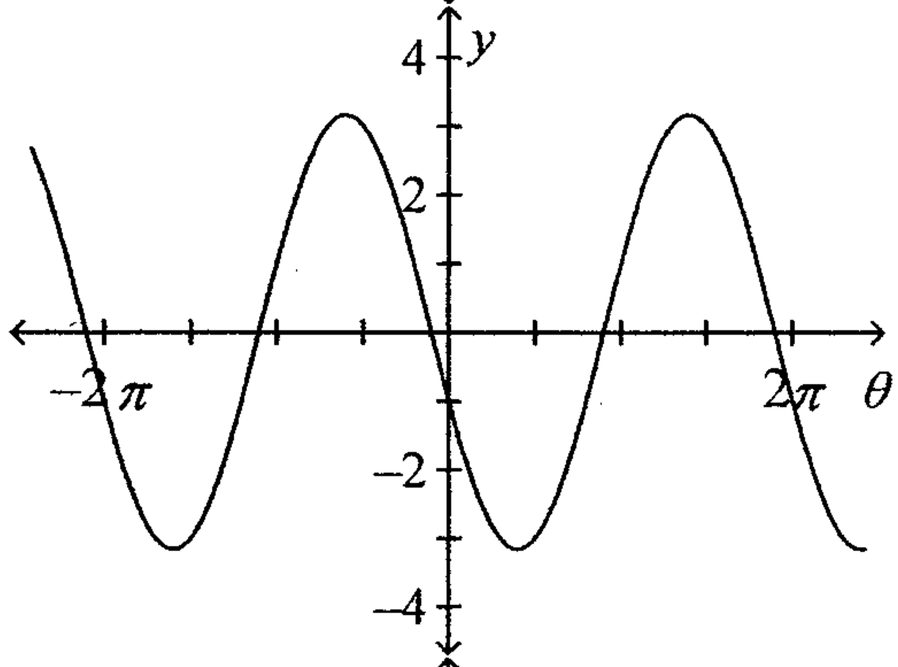
Graph the function.

8. $y = \cos x - 3\sin x$

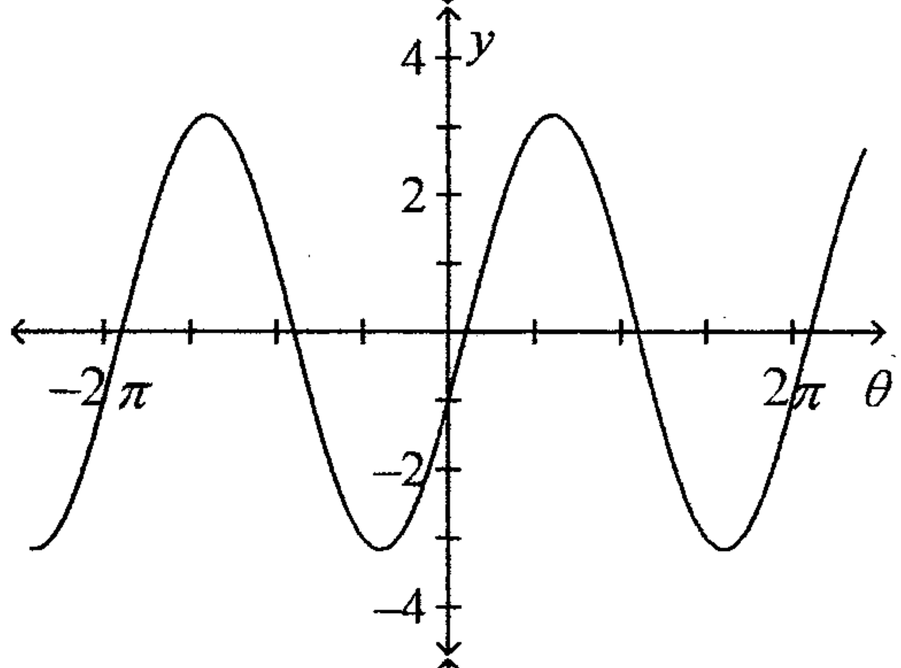
a.



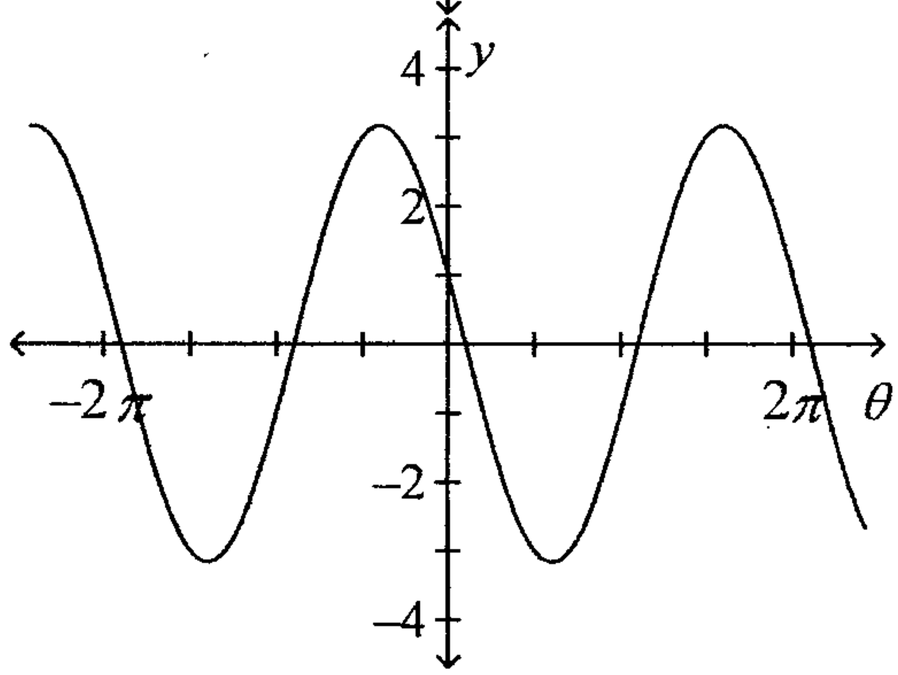
b.



c.



d.



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B 9. What basic trigonometric identity would you use to verify that $\cot x \sin x = \cos x$?

a. $\cos^2 x + \sin^2 x = 1$

b. $\cot x = \dfrac{\cos x}{\sin x}$

c. $\cos x = \dfrac{1}{\sec x}$

d. $\sin x = \dfrac{1}{\csc x}$

A 10. Find $\cos x$ if $\sin x \cot x = 4$.

a. 4 b. 2 c. 1 d. $\sqrt{2}$

C 11. Find $\cos x$ if $\dfrac{\sin^2 x - 1}{\cos x} = -1$.

a. -1 b. 2 c. 1 d. 0

A 12. If α and β are the measures of two first quadrant angles and $\sin \alpha = \dfrac{4}{5}$ and $\sin \beta = \dfrac{5}{13}$, find $\sin(\alpha + \beta)$.

a. $\dfrac{63}{65}$ b. $\dfrac{33}{65}$ c. $\dfrac{16}{65}$ d. $\dfrac{56}{65}$

D 13. If $\sin \theta = \dfrac{3}{5}$ and θ terminates in the first quadrant, find the exact value of $\cos 2\theta$.

a. $\dfrac{3}{5}$ b. $\dfrac{9}{25}$ c. $\dfrac{3}{10}$ d. $\dfrac{7}{25}$

A 14. Solve $5\tan x = 5\sqrt{3}$ for $0° \le x \le 180°$.

a. 60° b. 150° c. 30° d. 120°

D 15. Solve $2 - 3\cos x = 5 + 3\cos x$ for $0° \le x \le 180°$.

a. 150° b. 30° c. 60° d. 120°

D 16. Solve $\tan x \sec x - 2\tan x = 0$ for all real values of x.

a. $0 + 2\pi k, \dfrac{2\pi}{3} + \pi k$

b. $\dfrac{\pi}{3} + \pi k, \dfrac{2\pi}{3} + \pi k$

c. $0 + \pi k, \dfrac{\pi}{2} + 2\pi k$

d. $0 + \pi k, \dfrac{\pi}{3} + 2\pi k, \dfrac{5\pi}{3} + 2\pi k$

A 17. Simplify the expression $\left(3x^4 y^{-5}\right)^3$.

a. $\dfrac{27x^{12}}{y^{15}}$

b. $\dfrac{y^{15}}{27x^{12}}$

c. $\dfrac{y^{15}}{9x^4}$

d. $\dfrac{9x^4}{y^{15}}$

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C 18. Evaluate $\left(27^{-\frac{1}{3}}\right)^{-\frac{3}{3}}$.

$27^{\frac{1}{3}} = 3$

a. –3
b. –27
c. 3
d. 27

D 19. Evaluate the expression $\log_3\left(\frac{1}{243}\right)$.

$\log_3(3)^{-5}$

a. 5
b. $-\frac{1}{5}$
c. $\frac{1}{5}$
d. –5

P 20. Solve $\log_2 x = 3$.

$2^3 = x$

a. $\sqrt[2]{2}$
b. $\sqrt{3}$
c. 9
d. 8

C 21. Use a calculator to evaluate log 0.72.

a. –0.3285
b. 0.1427
c. –0.1427
d. 0.3285

B 22. Use a calculator to find antilog 3.36361.

a. 1745
b. 2310
c. 2035
d. 2335

A 23. Find the sum of the first 21 terms of the sequence 5, 9, 13, 17, 21, ...

$\frac{21}{2}(2(5) + 20(4))$

$10.5(10 + 80)$

$(10.5)(90) = 945$

a. 945
b. 944
c. 947
d. 946

C 24. Find the sum of the first 4 terms of the series.
$2 - 8 + 32 - 128 + \ldots$

Formula $\rightarrow$ $R = \frac{-8}{2} = -4$

$\frac{2 - 2(-4)^4}{1 - (-4)} =$

a. –101
b. –103
c. –102
d. –104

B 25. Evaluate the limit, or state that the limit does not exist. $\frac{4n - 6n}{10n}$

$\frac{-2n}{10n} = -\frac{1}{5}$

a. Limit does not exist
b. $-\frac{1}{5}$
c. 4
d. 0

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$\frac{-7}{14} = -\frac{1}{2} = r$

B

26. Find the sum of the geometric series.

$14 - 7 + \frac{7}{2} - \frac{7}{4} + \ldots$

$\frac{14}{1-\left(\frac{-1}{2}\right)} = \frac{14}{\frac{3}{2}} \cdot \frac{2}{3} = \frac{28}{3}$

a. $\frac{7007}{13}$

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

c. $\frac{5005}{7}$

d. 2002

B

27. Write $\sum_{k=6}^{11}(2k+5)$ in expanded form and find the sum.

a. $17 + 19 + 21 + 23 + 25; 27$

b. $17 + 19 + 21 + 23 + 25 + 27; 132$

c. $17 + 19 + 21 + 23 + 25; 132$

d. $19 + 21 + 23 + 25 + 27; 17$

5 terms

C

28. Find the seventh term of the expansion of $(3x + 7y)^{11}$.

a. $462\,(3x)^4(7y)^5$

b. $330\,(7x)^6(3y)^5$

c. $462\,(3x)^5(7y)^6$

d. none of these

$\frac{11!}{6!5!}(3x)^5(7y)^6$

$\frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5} = 462(243)\ldots$

B 29. Express the series 5 + 9 + 13 + . . . + 101 using sigma notation.

A. $\sum_{k=1}^{\infty}(4k+1)$ B. $\sum_{k=1}^{25}(4k+1)$ C. $\sum_{k=1}^{25}(4k-1)$ D. $\sum_{k=1}^{24}(4k+1)$

$101 = 5 + (n-1)4$

$96 = 4n - 4$

$100 = 4n$

$n = 25$

A 30. The expression $32x^5 + 80x^4 + 40x^3 + 40x^2 + 10x + 1$ is the expansion of which binomial?

A. $(2x+1)^5$ B. $(x+2)^5$ C. $(2x+2)^5$ D. $(2x-1)^5$

D 31. Find the fourth term in the expansion of $(3x - y)^7$.

A. $-105x^4y^3$ B. $420x^4y^3$ C. $1701x^4y^3$ D. $-2835x^4y^3$

$\frac{7!}{3!4!}(3x)^4(-y)^3$

$35(81)(-1)x^4y^3$

B 32. A car is bought for $25,000. The interest rate is 6.4% and the loan will be for 5 years. What would the monthly car payment be on this loan?

A. \$487.90 B. \$487.98 C. \$488.00 D. \$488.10

D 33. You want to buy a $175,000 house. What is the difference in the monthly mortgage payment between a 15 year loan and a 30 year loan? Use an interest rate of 4.5%

A. \$451.95 B. \$451.98 C. \$452.01 D. \$452.04

A 34. Solve sin2x = 5(sinx) for all values of x. Assume that K is any integer.

A. 180^0k B. 360^0k C. $90^0 + 180^0k$ D. $90^0 + 360^0k$

$2\sin x\cos x = 5\sin x$

$2\sin x\cos x - 5\sin x = 0$

$\sin x(2\cos x - 5) = 0$

$\sin x = 0, \cos x = \frac{5}{2}$

$0, 180^\circ$ O.T

B 35. Simplify: $\frac{cotx}{cosx} + \frac{1}{sinx}$

A. $2\cot^2 x$ B. $2\csc x$ C. $2\sin x$ D. No Solution

$\frac{\cos}{\frac{\sin}{\cos}} + \frac{1}{\sin}$

$\frac{\cos}{\sin} \cdot \frac{1}{\cos} + \frac{1}{\sin}$

$\frac{1}{\sin} + \frac{1}{\sin}$

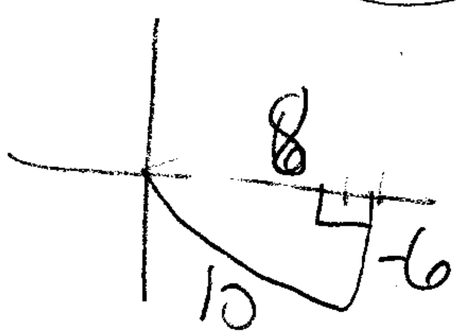
$\frac{2}{\sin} = 2\csc x$

B 36. Which is an example of a natural logarithm?

A. log 6 B. ln 6 C. Both A and B D. None of these

D 37. If cos x = 0.8 and $270^0 < x < 360^0$, find the exact value of cos2x.

A. -.96 B. -.28 C. .96 D. .28



$2(.8)^2 - 1$