

Complete each of the following problems **on separate paper and in order by chapter and number**. Work the problems neatly and in order! Write the problems, formulas, diagrams, and work for each in order to receive full credit. Clearly identify problems and circle answers.

The completed assignment is due at the beginning of the exam session. This is a 10-point graded assignment: 1-point each for accuracy on 10 randomly selected problems.

Chapter 6 – Analytical Trig

1.] Use the sum/difference or double/half angle formulas to find the **exact** value of $\cos 15^\circ$.

2.] Use the sum/difference or double/half angle formulas to find the **exact** value of $\tan 165^\circ$.

#3 -6: Given that $\sin \theta = -\frac{3}{4}$, θ is in quadrant IV, find the exact value of each angle.

3.] $\sin 2\theta$

4.] $\cos 2\theta$

5.] $\tan \frac{\theta}{2}$

6.] $\cos \frac{\theta}{2}$

7.] Solve the equation on the interval $[0, 2\pi)$: $\cos^2 \theta - \sin^2 \theta + \sin \theta = 0$.

8.] Solve the equation on the interval $[0, 2\pi)$: $4\cos^2(2\theta) - 3 = 0$.

9.] Solve the equation on the interval $(-\infty, \infty)$: $4\tan \theta - 3 = 1$

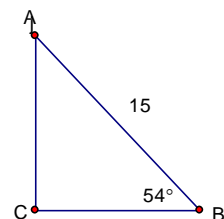
10.] Solve the equation on the interval $(-\infty, \infty)$: $2\sec(3\theta) + 5 = 1$.

Chapter 7 – Triangle Trig

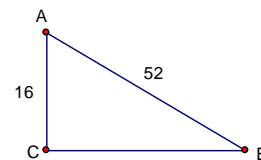
#11-12: Solve this triangle. Angle C is a right angle. Round answers to whole numbers. (Calculator problem)

11.] $a \approx ?$

12.] $b \approx ?$



#13-15: Solve this triangle. Angle C is a right angle.
Round answers to the nearest tenth. (Calculator)



- 13.] $a \approx ?$ 14.] $\angle A \approx ?$ 15.] $\angle B \approx ?$

16.] The angle of elevation from a spot on the ground 30 feet from the base of a tree to the top of a tree is 50° . How tall is the tree? (Calculator).

17.] Sam is standing at the top of a 75-foot tall building. He sees his friend standing on the ground at a location that is 100 feet from the base of the building. What is the angle of depression between Sam and his friend? (Calculator)

18.] A large flagpole stands at the top of the Smythe Office Building. From the street at a point 100 feet from the base of the building, the angle of elevation to the top of the flagpole is 55° . The angle of elevation to the bottom of the flagpole is 50° . Find the height of the flagpole. (Calculator).

19.] Given triangle ABC with $m\angle A = 40^\circ$, $b = 2$, $a = 3$, use Law of Sines to find the measure of angle B. Remember, there can be more than one answer!

20.] Given triangle ABC with $m\angle A = 35^\circ$, $b = 8$, $a = 6$, use Law of Sines to find the measure of angle B. Remember, there can be more than one answer!

21.] Given triangle ABC with $m\angle B = 100^\circ$, $c = 2$, $a = 3$, use Law of Cosines to find the measure of angle A.

22.] Given triangle ABC with $a = 10$ inches, $b = 8$ inches, and $c = 12$ inches, find the measure of angle B.

23.] Find the area of Triangle ABC with $m\angle B = 80^\circ$, $c = 6$, $a = 4$.

24.] Find the area of the triangle with sides 6, 8, and 9.

Chapter 3 – Polynomial and Rational Functions

25 -27: Use $f(x) = x^4 + 5x^3 + 3x - 4$.

25.] Use synthetic substitution to find $f(-3)$

26.] Use synthetic division to divide $f(x)$ by $(x+2)$.

27.] Is $(x + 1)$ a factor of $f(x)$?

28.] If $f(x) = 2x^3 - 4x^2 + 5x + k$, find k so that $(x + 1)$ is a factor.

29.] Find the zeros of $f(x) = 4x^3 + 12x^2 - 28x + 12$.

30.] Solve the equation over the complex numbers. $x^4 + 2x^2 = 3x^3 + 6x$

#31 – 32: Identify the hole, vertical asymptote, horizontal asymptote, intercepts, and key points for each. **Graph on graph paper.**

31.] $f(x) = \frac{4x}{x-7}$

32.] $f(x) = \frac{x^2 + 2x - 35}{x+7}$

33.] Use zeros, multiplicities, end behaviors, and key points to sketch a good graph of the function: $f(x) = x^4 - 3x^3 + x^2 + 3x - 2$. **Use graph paper.**

#34 – 35: Solve each inequality. Write answers in interval notation.

34.] $2x^2 - 5x < x + 8$

35.] $\frac{3x-5}{x+2} \geq 2$

Chapter 4 – Log and Exponential Functions

36.] Write in logarithmic form: $4^3 = 64$.

37.] Write in exponential form: $\log_7 b = 13$.

38 -41 : Solve for x

38.] $64 = 4^{(5x-3)}$

39.] $\log_2(x-6) + \log_2 x = 4$

40.] $e^{-0.097x} = 12$

41.] $3^{(x-1)} = 5^{2x}$

42.] Write $2\log_6 x - (3\log_6 y + \log_6 z)$ in condensed form.

43.] Write $\log_4 \frac{x^3 y^2}{\sqrt{w}}$ in expanded form.

44 – 46: Graph each on **graph paper**.

44.] $f(x) = 4^{-x}$

45.] $y = 3^x$

46.] $\log_3 x = y$

47.] If \$2000 is invested at 4% interest, compounded continuously, how much will be in the account at the end of five years?

48.] Solve: Determine the amount of money, P, that must be invested at a rate of 8% interest compounded quarterly so that the amount in the account, A, in 40 years will be \$200,000.

49.] Solve: The spread of a virus through a population is modeled by the equation

$$y = \frac{1000}{1 + 990e^{-0.7t}}, \text{ where } y \text{ is the total number of people infected and } t \text{ is time in days.}$$

In how many days will 530 people be infected with the virus?

50.] A certain amount of bacteria doubles every 10 hours.

If there were 100 grams of bacteria at noon on day 1, how many bacteria will be present at midnight of the next day?

Chapter 11 - Sequences

51 – 53: Classify each sequence as arithmetic, geometric, or neither.

51.] 100, 50, 25, ... 52.] 9, 12, 15, ... 53.] $\frac{1}{9}, \frac{1}{12}, \frac{1}{15}, \dots$

54.] Determine if the sequence $a_n = \frac{1}{2n}$ converges or diverges.

55.] Identify the 4th term of the sequence described by $a_n = 5 + n^2$.

56.] Identify the 3rd term of the sequence described by $a_1 = 5$ and $a_{n+1} = a_n - 2$.

57.] Write a recursive formula for the sequence 4, 9, 19, 39 . . .

58.] Write an explicit formula for the sequence 2, -4, 8, -16, . . .

59.] Find a_{23} for $19 + 15 + 11 + 7 + \dots$

60.] Find $\sum_{n=1}^{500} (3n + 5)$

61.] Find $\sum_{n=0}^{10} 2\left(\frac{3}{5}\right)^n$.

62.] Find $\sum_{n=0}^{\infty} 2\left(\frac{1}{2}\right)^n$.

- 63.] 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, etc.
- 64.] A new car depreciates in value at a rate of 20% each year. If the value of a car when it is new is \$30,000, find its value after 5 years.
- 65.] Change $2.2545454\ldots$ to a fraction.

(Seniors do NOT need to know #66-70)

66.] Evaluate $\binom{93}{91}$.

67.] Evaluate $\frac{n!}{(n+2)!}$

68.] Find the coefficient of the a^4b^3 term in $(a - b)^7$.

69.] Expand $(2x - y)^5$.

70.] Use math induction to verify that $1 + 5 + 5^2 + 5^3 + \dots + 5^{n-1} = \frac{1}{4}(5^n - 1)$.

You should also review and re-work problems from the following:

- Tests and Quizzes
- Examples from notes sheets
- Homework problems
- Skills Reviews
- Chapter Reviews from textbook

PreCalculus Exam Review – Answers

These are answers only, make sure you know HOW to arrive at these answers! Don't forget to go back and review chapter tests, quizzes, review worksheets, and homework problems.

Chapter 6

$$1.] \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$2.] -2 + \sqrt{3}$$

$$3.] \frac{-3\sqrt{7}}{8}$$

$$4.] \frac{-1}{8}$$

$$5.] \frac{4 - \sqrt{7}}{-3}$$

$$6.] -\sqrt{\frac{4 + \sqrt{7}}{8}}$$

$$7.] \theta = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{2}$$

$$8.] \theta = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{7\pi}{12}, \frac{11\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}, \frac{19\pi}{12}, \frac{23\pi}{12}$$

$$9.] \theta = \frac{\pi}{4} + \pi k$$

$$10.] \theta = \frac{2\pi}{9} + \frac{2\pi}{3}k, \frac{4\pi}{9} + \frac{2\pi}{3}k$$

Chapter 7

$$11.] a = 8.8$$

$$12.] b = 12.1$$

$$13.] a = 49.5$$

$$14.] A = 72.1$$

$$15.] B = 17.9$$

$$16.] x = 35.8$$

$$17.] x = 36.9$$

$$18.] y = 23.6$$

$$19.] B = 25.4$$

$$20.] B = 50 \text{ and } 130$$

$$21.] \alpha = 49.53^\circ \quad (b = 3.9)$$

$$22.] B = 41.4$$

$$23.] \text{area} = 11.8 \text{ sq. units}$$

$$24.] \text{area} = 23.5 \text{ sq. units}$$

Chapter 3

25.] -67

26.] $x^3 + 3x^2 - 6x + 15 - \frac{34}{x+2}$

27.] no

28.] $k = 11$

29.] $x = 1, -2 \pm \sqrt{7}$

30.] $x = 0, 3, \pm i\sqrt{2}$

31.] no hole, VA: $x = 7$, HA: $y = 4$, x-int(0, 0), y-int(0, 0)

32.] hole: $(-7, -12)$, VA: none, HA: none, SA: none, x-int(5, 0), y-int(0, -5)

33.] graph- use calculator to check

34.] $(-1, 4)$

35.] $(-\infty, -2), [9, \infty)$

Chapter 4

36.] $\log_4 64 = 3$

37.] $7^{13} = b$

38.] $\frac{6}{5}$

39.] 8 (-2 is extraneous)

40.] -25.618

41.] -.518

42.] $\log_6 \frac{x^2}{y^3z}$

43.] $3\log_4 x + 2\log_4 y - \frac{1}{2}\log_4 w$

44 – 46.] graphs

47.] \$2442.81

48.] \$8414.00

49.] 10.025

50.] 229.74 grams

Chapter 11

51.] Geometric

52.] Arithmetic

53.] Neither

54.] converges

55.] 21

56.] 1

57.] $a_1 = 4, a_n = 2a_{n-1} + 1$

58.] $a_n = 2(-2)^{n-1}$ or $a_n = (-1)^{n-1}(2)^n$

59.] -69

60.] 378,250

61.] 4.981

62.] 4

63.] 1700

64.] \$9830.40

65.] $\frac{124}{55}$

66.] 4278

67.] $\frac{1}{n^2 + 3n + 2}$

68.] $-35a^4b^3$

69.]

$$32x^5 - 80x^4y + 80x^3y^2 - 40x^2y^3 + 10xy^4 - y^5$$

70.] Math induction – your work is your answer