

GOOD COUNSEL MATH DEPARTMENT

Summer Math Packet for Students entering

Honors Pre-Calculus Pre-Calculus

The problems in this packet are meant to help you review material that you have learned in previous math courses and will need to understand in order to be successful in Pre-Calculus. Try to complete all problems without a calculator. Show all of your work on a separate sheet of paper. ALL work should be completed to the best of your ability. **You will be tested on the material during the first two weeks of school.**

Have a great summer. We are looking forward to seeing you this fall.

Student Name _____

Previous Course Taken _____

Geometry Formulas:

$$a^2 + b^2 = c^2$$

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

Algebra Reminders:

Slope intercept form of a line: $y = mx + b$

$$\textit{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

When solving a quadratic equation, it first must equal zero.

$$\text{Quadratic Formula } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\log_b a = x, \text{ then } b^x = a$$

$$\log_b a = \frac{\log a}{\log b}$$

Part I: Simplify the expressions completely. (Do not use your calculator).

1. $2\sqrt{72}$

2. $(2a^4b^3)(3ab^2)$

3. $\frac{2xy^6z^{-2}}{8x^4yz^8}$

4. $(4x^2 + 5x + 3) + (7x^2 - 6)$

5. $(-8x^2 + x + 5) - (2x^2 - 2x)$

6. $(2x + 1)(x^2 - 2x - 3)$

7. $(3x - 1)^2$

8. $(4^{\frac{2}{3}})(4^{\frac{4}{3}})$

9. $\sqrt[5]{4^{\frac{2}{5}}}$

10. $\frac{88^{1/3}}{11^{1/3}}$

11. $\frac{x^2 - 3x - 10}{x^2 - 6x + 5} * \frac{x - 1}{x^2 - 4}$

12. $\frac{x+4}{x+3} + \frac{1}{x-3}$

13. $\frac{\frac{6}{x+2}}{\frac{1}{4} + \frac{3}{x+2}}$

14. $(4 + \sqrt{2})^2$

15. $-\sqrt{-4i}$

16. $(4 - 2i)(3 + i)$

Part II: Factor completely.

17. $x^2 - 14x + 24$

18. $x^2 - 49$

19. $x^4 - 14x^2 + 49$

20. $x^3 + x^2 - 4x - 4$

21. $5x^2 - 25x$

22. $3x^2 + 14x - 5$

Part III: Functions

Evaluate.

23. $f(x) = x^2 + 4x - 7$; $f(2)$

24. $f(x) = 5x + 8$; $f(-3)$

Given $f(x) = 3x - 8$ and $g(x) = x^2$, find:

25. $f(3)$

26. $f(x) + g(x)$

27. $f(x) - g(x)$

28. $f(x) \cdot g(x)$

29. $f(g(x))$

30. $g(f(3))$

State whether the given relation is a function

31. $\{ (0,-5) (1,3) (2,2) (0,4) (-5,6) (3,4) \}$

32. $\{ (-1,6) (5, 6) (2,4) (0,3) (1,2) (3,1) \}$

Find the inverse relation.

33. $\{(-10, 3), (-9, 4), (-8, 5), (-7, 6)\}$

34. $y = 4x + 20$

Part IV: Function properties

For the given function, find the following:

35. $y = \frac{1}{4}(x - 2)^2 + 6$

- a. vertex
- b. y intercept

36. $y = 3x^2 - 12x + 13$

- a. vertex
- b. y intercept

37. $f(x) = \frac{(2x - 6)(x + 1)}{(x - 1)(x + 2)}$

- a. Vertical Asymptotes
- b. Horizontal Asymptote

Find the x and y intercepts.

38. $f(x) = 3x^2 - x - 4$

39. $f(x) = 2(x - 3)^2 - 2$

Part V: Equation Solving

41. $(x - 4)^2 = 81$

42. $\frac{2}{3x+6} = \frac{x+2}{x^2-10}$

43. $\sqrt{7-2x} = x-2$

44. $x^2 - 9 = x - 3$

45. $\log_2 8 = x$

46. $5^x = 625$

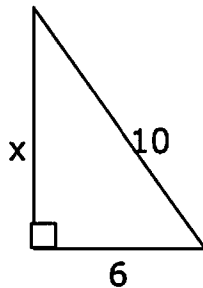
47. $4^x = 2^5$

48. $\log_2 x = 5$

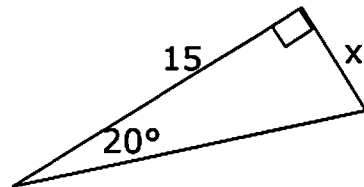
Part VI: Review of Geometry

Find the indicated side or angle of the right triangle. Leave your answers in radical form where appropriate. When finding angles, round your answer to the nearest tenth.

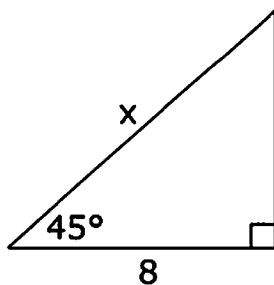
50.



51.



52.



53.

