

# GOOD COUNSEL MATH DEPARTMENT

Summer Math Packet for Students entering

## AP Calculus AB IB Calculus Calc. w/ Applications

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 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 \_\_\_\_\_

**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.  $\sqrt[5]{4^{\frac{2}{3}}}$

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

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

25.  $f(3)$

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

27.  $g(x) \div f(x)$

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

29.  $f(g(x))$

30.  $g(f(1))$

**State whether the given relation is a function**

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

32.  $x = 5$

**Find the inverse.**

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 Trig**

Trig Formulas:

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

$$\text{radians} = \text{degrees} \times \frac{\pi}{180}$$

$$\sin \theta = \frac{y}{r}$$

$$\text{Law of Sines: } \frac{\sin A}{a} = \frac{\sin B}{b}$$

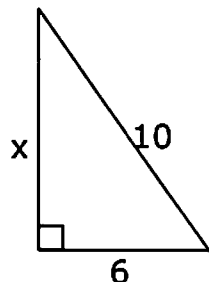
$$\cos \theta = \frac{x}{r}$$

$$\text{Law of Cosines: } c^2 = a^2 + b^2 - 2ac \cos C$$

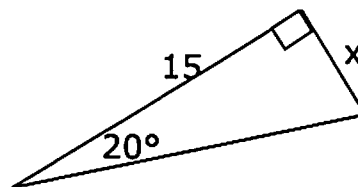
$$\tan \theta = \frac{y}{x}$$

50. 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.

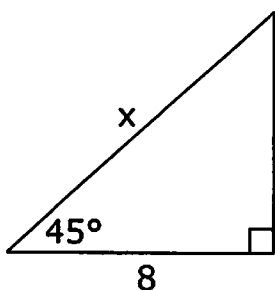
a.



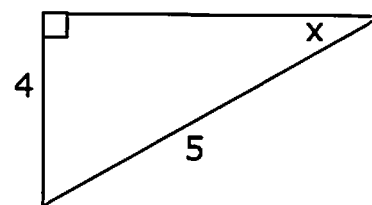
b.



c.



d.



51. Sketch the angle in standard position

a.  $\frac{3\pi}{4}$

b.  $-\frac{7\pi}{6}$

52. Write the equivalent angle in radians.

a. 210 degrees

b. 300 degrees

53. Evaluate without a calculator:

a.  $\cos \frac{11\pi}{6}$

b.  $\sin \frac{5\pi}{4}$

c.  $\tan \frac{5\pi}{3}$

d.  $\sec \frac{2\pi}{3}$

e.  $\sin \pi$

f.  $\cot -\frac{\pi}{2}$

54. Solve each of the following.

a.  $\sin [\cos^{-1} (-\frac{\sqrt{3}}{2})]$

b.  $\sin^{-1}[\cos (\frac{5\pi}{3})]$

55. Solve on the interval of  $[0, 2\pi)$ .

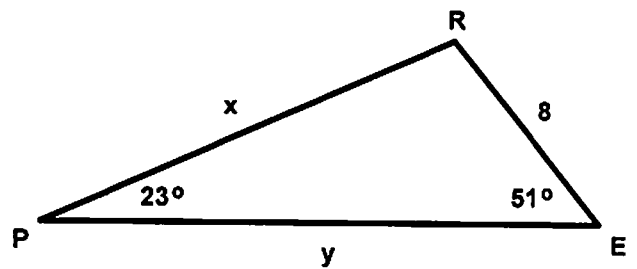
a.  $2 \sin x - 1 = 0$

b.  $\sin x + \sqrt{2} = -\sin x$

c.  $3 \tan^2 x - 1 = 0$

d.  $\cot x \cos^2 x = 2 \cot x$

56. Find  $x$  and  $y$  using Law of Sines.



57. Solve for  $c$  using the Law of Cosines.

