

Dear Cleveland Pre-Calculus forcastee/candidate,

The Cleveland Math Department wants you to have a positive, successful experience next year. In order for that to happen, you need to be prepared with prerequisite Algebra and Geometry skills.

When you return to school next fall, your Pre-Calculus teacher will give you a test which will be worth approximately 10% of your first quarter grade. It will be composed of 15-20 questions, verbatim, from this packet. Some questions will be done without a calculator. Be prepared to show the set-up & work for each question.

The work in this packet is basic algebra and geometry. If you can't or won't prepare for the class, you may not be ready for Pre-Calculus and a different math class would be a better fit for your schedule next year. We look forward to working with you.

Sincerely,

Cleveland H.S Math Department

Pre-Cal Summer Training/Prep

A. Write the equation of each line($y=mx+b$ when possible). Include set-up.

- (1) The line through points $(-5, -11)$ & $(15, 5)$
- (2) The line through $(11, 2)$ w/ slope = $-9/4$
- (3) The line through $(5, 18)$ parallel to $3x + 4y = 88$
- (4) The line through $(10, 2)$ perpendicular to $y = (-8/3)x + 10$
- (5) The line through $(8, -1)$ & parallel to the line through $(11, 6)$ & $(1, 18)$
- (6) The line through $(-4, 20)$ & perpendicular to the line through $(-3, 2)$ & $(6, -8)$
- (7) The line through $(2, 18)$ w/ x-intercept $x=10$
- (8) The horizontal line through $(-1, 11)$
- (9) The vertical line through $(6, -8)$

B. For these four set of points, calculate the distance between them(2decimal places) & their midpoint. Include set-ups.

- | | |
|---------------------------|----------------------------|
| (1) $(2, 16)$ & $(9, 10)$ | (2) $(-4, 2)$ & $(12, 19)$ |
| (3) $(6, 8)$ & $(1, -3)$ | (4) $(-3, 10)$ & $(5, -1)$ |

C. For the following sets of points, B is the midpoint of A & C. Solve for all variables. Include set-ups.

- | | | |
|---|----|----|
| (1) A $(2, 19)$, B $(9, 13.5)$, C (x, y) | x= | y= |
| (2) A $(x, 2)$, B $(10.5, -4)$, C $(16, y)$ | x= | y= |

D. Factor each expression completely(w/in the real #s).

- | | | |
|---------------------|----------------------|----------------------------|
| (1) $x^2 - 8x - 20$ | (2) $x^2 - 10x + 24$ | (3) $4x^2 - 31x - 45$ |
| (4) $4x^2 + 18x$ | (5) $5x^2 - x$ | (6) $2x^4 - 19x^3 + 24x^2$ |
| (7) $x^2 - 36$ | (5) $4x^2 - 81$ | |

E. Find the product of each.

(1) $(2x - 5)(x + 8)$

(2) $(3w + 4)(2w - 11)$

(3) $(x + 2y)(5x - y)$

(4) $(4c - 3y)(2c - 3y)$

(5) $(4x - 5)^2$

(6) $(8h - 1)^2$

(7) $(6x + 5)(x^2 - 3x + 8)$

(8) $(4x - 5)(2x^2 + x - 10)$

F. Simplify each according to the rules of exponents for monomials.

Only positive exponents in answers.

(1) $(5x^4)(-8x^5)$

(2) $(-x^4y)(10x^2y^5)$

(3) $(-3x^2w^5)^4$

(4) $(-2ky^6)^3$

(5) $\frac{-90x^8m^3}{10x^5m^5}$

(6) $\frac{18xk^3}{30x^4k}$

(7) $\frac{(-6ym^2)^3}{4ym^3}$

(8) $\frac{(-10h^4k^3)^2}{60h^3k^8}$

G. Do this part WITHOUT A CALCULATOR. Simplify each expression, reducing answers to lowest terms.

1. $\frac{3}{8} + \frac{1}{10}$

2. $\frac{5}{6} + \frac{1}{15}$

3. $\frac{5}{6} - \frac{3}{10}$

4. $\frac{11}{12} - \frac{8}{15}$

5. $\frac{12}{13} \times \frac{5}{16}$

6. $\left(\frac{8}{9}\right)\left(\frac{10}{11}\right)$

7. $\frac{8}{11} \div \frac{3}{5}$

8. $\frac{\frac{3}{16}}{\frac{5}{6}}$

H. Solve using the Quadratic Formula. Show the setup of the solution and round your answers to one decimal place.

1. $x^2 + 5x - 24 = 0$

2. $2x^2 - 9x + 4 = 0$

3. $10x^2 + 10x + 2 = x$

4. $x^2 - 11x + 29 = -1$

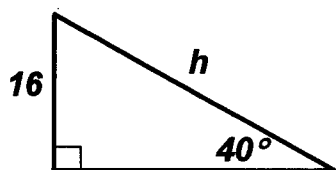
5. $2x^2 + 8x + 3 = x^2 + 1$

6. $3x^2 - 5x = 1$

7. $4x^2 + x - 6 = 0$

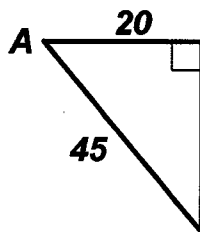
I. Solve each triangle for the specified quantity. Show the setup of the solution and round your answers to one decimal place. *Triangles may not be to scale.*

1.



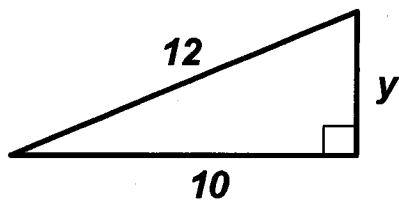
$$h = \underline{\hspace{2cm}}$$

2.



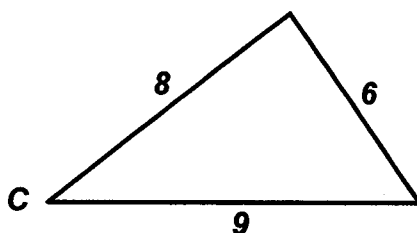
$$A = \underline{\hspace{2cm}}$$

3.



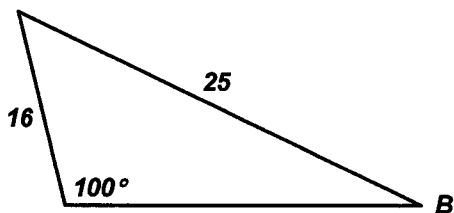
$$y = \underline{\hspace{2cm}}$$

4.



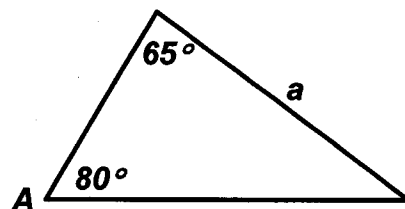
$$C = \underline{\hspace{2cm}}$$

5.



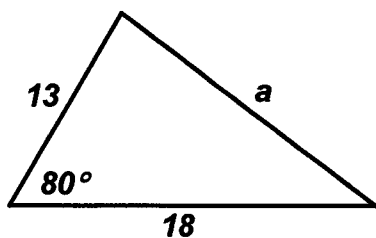
$$B = \underline{\hspace{2cm}}$$

6.



$$a = \underline{\hspace{2cm}}$$

7.



$$a = \underline{\hspace{2cm}}$$

J. Solve.

1) $14 = -(p - 8)$

2) $-18 - 6k = 6(1 + 3k)$

3) $-(1 + 7x) - 6(-7 - x) = 36$

4) $5x + 4 - 7x = 5 + x - 13$

5) $3x + 3(5x - 18) = 108$

6) $60 - 4m + 2m = -2(m - 20)$

K. Solve.

1) $\frac{1}{4}(12x + 4) - 14 = -\frac{1}{2}(8x - 16)$

2) $38 = -19/20 \cdot x$

3) $\frac{1}{4}x - \frac{3}{4}x = \frac{1}{2}$

4) $7/2(x - 3) = 4/5(x + 10)$

5) $\frac{3}{4}m + 10 = -10$

6) $100/101 \cdot (2x + 1) = -1/101$

L. Solve.

1) $3 < -5n - 2n$

2) $6x + 2 + 6x < 14$

3) $-138 \geq -6(6n - 7)$

4) $-1 - 6v - 6 > -11 - 7v$

5) $-5n - 6n < 8 - 8n - n$

6) $-2(5 + 6g) < 6(8 - 2g)$

M. Solve.

1) $\frac{5}{6} = \frac{7n + 9}{9}$

2) $\frac{g - 9}{5} = \frac{g + 5}{8}$

3) A 380-cubic-centimeter sample of titanium has a mass of 1710 grams. Find the mass of a titanium sample that has a volume of 532 cubic centimeters.

4) $\frac{x + 2}{3} = \frac{8}{x}$

5) $\frac{2m - 4}{5} = \frac{6}{m}$

N. Solve.

1) $7x + 2y = 24$
 $8x + 2y = 30$

2) $-4x + 9y = 9$
 $x = 3y - 6$

3) $2x - 6 = -8y$
 $15 - 5x - 20y = 0$

4) $-3x + 3y = 4$
 $-x + y = 3$

5) $y = 6x - 11$
 $-2x - 3y = -7$

6) The difference of two numbers is 3. Their sum is 13. Write a system of equations and solve it to find the #s.

7) $6x + 5y = -7/4$ and $-3x - 2y = 1$

O. Absolute Value Equations

Solve the following equations.

1. $|x - 2| = 11$

2. $|2x + 3| = 7$

3. $|x + 5| + 10 = 2$

4. $4|2x - 3| = 16$

5. $15 - 2|x + 1| = 3$

P. Function Notation

1. Given $f(x) = 4x$

a) Calculate $f(-2)$

b) Find the value of x , when $f(x) = 10$

2. Given $f(x) = \frac{3}{5}x - 2$

a) Calculate $f(5)$

b) Find the value of x , when $f(x) = 4$

3. Given $g(x) = 2x^2 - 5$

a) Calculate $g(-3)$

b) Solve $g(x) = 27$

4. Given $h(x) = \sqrt{x + 11}$

a) Calculate $h(-2)$

b) Solve $h(x) = 4$

5. Given $f(x) = 5x + 3$ and $g(x) = x^3$, evaluate $f(2) - g(-2)$

Q. Exponential Growth and Decay

1. You have \$3000 in an account that pays 8.5% annual interest. What is the balance after 7 years?
2. Assume that a DVD loses 30% of its value every year it is in the store. If the initial value of the DVD was \$45 what is its value after 4 years?
3. Sam is planning to buy a \$16,500 car. The depreciation rate for this car is 20% annually.
 - a) Write an equation giving the value y of the car in x years.
 - b) What will be the value of the car after 36 months?
4. A bacteria colony of 500 grows at a rate of 7% per day.
 - a) Write an equation modeling this exponential growth.
 - b) What will the bacteria population be after 6 days?
5. In seven years Ann's son Stu is leaving home for college. Ann hopes to save \$8000 to pay for his first year. She has \$5000 now in a bank that pays 7.75% annual interest. At this rate, will she have the money she needs for Stu's first year of college?

R. Circles

Memorize: $C = 2 \pi r$, $A = \pi r^2$, use 3.14 (these will not be provided on the test).

Solve each(2 decimal places)

(1) $r = 5$, $C =$, $A =$

(2) $r = 11.2$, $C =$, $A =$

(3) $r =$, $C = 58$, $A =$

(4) $r =$, $C =$, $A = 86$

(5) $C =$, $A = 30$

(6) $C = 202$, $A =$

Solutions

(1) $r = 5$, $C = 31.40$, $A = 78.50$

(2) $r = 11.2$, $C = 70.34$, $A = 393.88$

(3) $r = 9.24$, $C = 58$, $A = 268.09$

(4) $r = 5.23$, $C = 32.84$, $A = 86$

(5) $C = 19.41$, $A = 30$

(6) $C = 202$, $A = 3249.61$

ANSWERS

A.

1. $y = \frac{4}{5}x - 7$ 2. $y = -\frac{9}{4}x + \frac{107}{4}$ 3. $y = -\frac{3}{4}x + \frac{87}{4}$ 4. $y = \frac{3}{8}x - \frac{7}{4}$

5. $y = -\frac{6}{5}x + \frac{43}{5}$ ~~$y = -\frac{10}{9}x + \frac{140}{9}$~~ 7. $y = -\frac{9}{4}x + \frac{45}{2}$

8. $y = 11$ 9. $x = 6$ ⑥ $y = \frac{9}{10}x + 23.6$

B.

1. 10.63 (5.5, 13) 2. 23.35 (4, 10.5) 3. 12.08 (3.5, 2.5) 4. 13.6 (1, 4.5)

C.

1. $x = 16$
 $y = 8$ 2. $x = 5$
 $y = -10$

D.

1. $(x - 10)(x + 2)$ 2. $(x - 6)(x - 4)$ 3. $(4x + 5)(x - 9)$ 4. $2x(2x + 9)$
5. $x(5x - 1)$ 6. $x^2(2x - 3)(x - 8)$ 7. $(x - 6)(x + 6)$ 8. $(2x - 9)(2x + 9)$

E.

1. $2x^2 - 11x - 40$ 2. $6w^2 - 25w - 44$ 3. $5x^2 + 9xy - 2y^2$
4. $8c^2 - 18cy + 9y^2$ 5. $16x^2 - 40x + 25$ 6. $64h^2 - 16h + 1$
7. $6x^3 - 13x^2 + 3x + 40$ 8. $8x^3 - 6x^2 - 45x + 50$

F.

1. $-40x^9$ 2. $-10x^6y^6$ 3. $81x^8w^{20}$ 4. $-8k^3y^{18}$
5. $\frac{-9x^3}{m^2}$ 6. $\frac{3k^2}{5x^3}$ 7. $-54y^2m^3$ 8. $\frac{5h^5}{3k^2}$

G.

1. $\frac{19}{40}$ 2. $\frac{9}{10}$ 3. $\frac{8}{15}$ 4. $\frac{23}{60}$ 5. $\frac{15}{52}$ 6. $\frac{80}{99}$ 7. $\frac{40}{33}$ 8. $\frac{9}{40}$

H.

1. -8, 3 2. 4, 0.5 3. -0.4, -0.5 4. 5, 6 5. -0.3, -7.7 6. 1.8, -0.2 7. 1.1, -1.4

I.

1. $h = 24.9$ 2. $A = 63.6^\circ$ 3. $y = 6.6$ 4. $C = 40.8^\circ$ 5. $B = 39.1^\circ$
6. Not enough info 7. $a = 20.3$

J.

1. $p = -6$ 2. $k = -1$ 3. $x = 5$ 4. $x = 4$ 5. $x = 9$ 6. no solution

K.

1. $x = 3$ 2. $x = -40$ 3. $x = -1$ 4. $x = \frac{185}{27}$ 5. $m = -\frac{80}{3}$ 6. $x = -\frac{101}{200}$

L.

1. $n < -\frac{3}{7}$ 2. $x < 1$ 3. $n \geq 5$ 4. ~~$x > +4$~~ 5. $n > -4$ 6. ~~no solution~~
ALL REAL #s

M.

1. $n = -\frac{3}{14}$ 2. $g = +\frac{97}{3}$ 3. 2394 grams 4. $x = -6, 4$ 5. $m = 5, -3$

N.

1. (6, -9) 2. (9, 5) 3. infinite solutions; $x \in R$ 4. no solution 5. (2, 1) 6. (8, 5)
7. $(-\frac{1}{2}, \frac{1}{4})$

O.

1. $x = 13, -9$ 2. $x = 2, -5$ 3. no solution 4. ~~$500(1.07)^x = 250$~~ 5. $x = 5, -7$

$x = 3.5, -0.5$

P.

1. $-8, x = 2.5$ 2. $1, x = 10$ 3. $13, x = \pm 4$ 4. $3, x = 5$ 5. 21

Q.

≈ 5310.42

1. ~~$\$10.80$~~ 2. $\$10.80$ 3. $y = 16500(0.8)^x$ $\$8450$ 4. $y = 500(1.07)^x$ 750

5. Yes, $\$8431.23$