



CHRISTOPHER COLUMBUS

A Marist Brothers High School 1958



Dear Calculus Student,

Welcome to Calculus! Calculus is the branch of math that studies how things change and how things add up over time. It helps us understand and measure motion, growth, change, and totals in the real world. Topics included are limits, slopes, tangent lines, derivatives, and integrals.

This summer assignment addresses material that you have been exposed to in previous math courses. It serves two purposes:

1. It will allow you to remain mathematically fresh during the summer.
2. It will allow you to enter Calculus prepared and ready with a review of previous mathematical concepts.

Grading:

- The summer assignment is due on the first day of your class.
- You will need to print this assignment. To receive credit, all work must be shown. All work must be done in **pencil**, neat and organized.
- All questions will be reviewed by your teacher during the first week of school.
- A test will be given on the material in the summer packet during the second week of school.

Please feel free to email me if you have any questions. I hope that you have an enjoyable summer and return to ready for Calculus!

Ms. Brown



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Summer Assignment

Simplify each expression.

1) $(3b + 2b^4 - 3b^3) - (4b^3 - b^4 - 7b)$

- A) $5b^4 - 14b^3 + 10b$
 B) $3b^4 - 14b^3 + 10b$
 C) $5b^4 - 14b^3 + 3b$
 D) $3b^4 - 7b^3 + 10b$

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

- A) $-7x^4 - 5x^3 + 12x^2 - 3x$
 B) $-7x^4 - 5x^3 + 12x^2 + 3x$
 C) $-7x^4 - 2x^3 + 12x^2 + 3x$
 D) $-7x^4 + 12x^2 + 3x$

Find each product.

3) $4(8p - 7)$

- A) $20p + 8$ B) $5p + 15$
 C) $2p - 2$ D) $32p - 28$

4) $(4k + 5)(k + 8)$

- A) $4k^2 - 27k - 40$
 B) $4k^2 + 40$
 C) $4k^2 + 37k + 40$
 D) $4k^2 + 27k - 40$

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

- A) $21p^3 + 32p^2 - 46p + 48$
 B) $18p^3 - 30p^2 + 24p - 8$
 C) $35p^3 + 18p^2 + 35p - 8$
 D) $48p^3 - 4p^2 + 2p + 24$

6) $(3b^2 - 6b + 6)(8b^2 - 6b + 1)$

- A) $32b^4 + 40b^3 - 88b^2 + 3b + 18$
 B) $24b^4 + 30b^3 + 15b^2 - 30b + 6$
 C) $24b^4 - 66b^3 + 87b^2 - 42b + 6$
 D) $24b^4 - 30b^3 + 15b^2 + 30b + 6$

Write each expression in exponential form.

7) $(\sqrt{7k})^3$

- A) $(10k)^{\frac{7}{4}}$ B) $(3k)^{\frac{2}{3}}$
 C) $(7k)^{\frac{3}{2}}$ D) $(10k)^{\frac{7}{6}}$

8) $(\sqrt[3]{a})^5$

- A) $(7a)^{\frac{3}{2}}$ B) $(2a)^{\frac{2}{5}}$
 C) $(10a)^{\frac{7}{6}}$ D) $a^{\frac{5}{3}}$

Write each expression in radical form.

9) $x^{\frac{1}{2}}$

- A) $(\sqrt[3]{5x})^2$ B) \sqrt{x}
 C) $(\sqrt[6]{10x})^5$ D) $(\sqrt{x})^5$

10) $(5n)^{\frac{1}{4}}$

- A) $\sqrt[4]{5n}$ B) $\sqrt[3]{2n^2}$
 C) $(\sqrt[4]{5n})^3$ D) $\sqrt{6n}$

Simplify.

11) $(32x^{10})^{\frac{4}{5}}$

- A) $1024x^5$ B) $16x^8$
C) $243x^5$ D) x^3

12) $(m^2)^{\frac{3}{2}}$

- A) $2401m^4$ B) $100m^2$
C) m^3 D) $32m^5$

13) $(343v^3)^{\frac{2}{3}}$

- A) $6v$ B) $1024v^5$
C) $2401v^{12}$ D) $49v^2$

14) $(216x^6)^{\frac{2}{3}}$

- A) $2x^2$ B) $9x$
C) $36x^4$ D) $5x$

15) $(25a^6)^{-\frac{3}{2}}$

- A) $\frac{1}{125a^9}$ B) $512a^6$
C) a^4 D) a^8

Simplify. Your answer should contain only positive exponents.

16) $\frac{ab^{-1} \cdot 2ab}{(2ba^{-2})^{-3} \cdot 2a^2b^{-2}}$

- A) $\frac{4b^6}{a^4}$ B) $\frac{8b^5}{a^6}$
C) $\frac{16a^{80}}{b^{32}}$ D) $\frac{8b^{24}}{a^{15}}$

17) $\frac{((2y^{-1})^2 \cdot (2x^2y^{-1})^{-3})^4}{y^3}$

- A) $\frac{1}{8x^6y^3}$ B) $\frac{y}{16x^{24}}$
C) $\frac{x^{20}}{32}$ D) $\frac{16y^3}{x^7}$

18) $\left(\frac{2ab \cdot a^2b^2}{2ba^2}\right)^{-1}$

- A) b^5 B) $\frac{b^4}{8a^2}$
C) $\frac{1}{ab^2}$ D) $\frac{a^7}{4b^{12}}$

19) $\frac{(2b)^{-3} \cdot a^{-2}b^{-2}}{a^{-1}b^4}$

- A) $\frac{1}{a^5b^8}$ B) $\frac{8}{a^{15}b^3}$
C) $\frac{a^{17}}{16b^{13}}$ D) $\frac{1}{8b^9a}$

20) $\frac{2x^2 \cdot 2x^2y^{-1}}{(y^2)^2}$

- A) $\frac{2x^3}{y^6}$ B) $\frac{4x^4}{y^5}$
C) $\frac{4y^7}{x}$ D) $\frac{1}{4y^7x^{12}}$

21) $\frac{xy \cdot 2xy^{-1}}{x^{-1}y^{-4} \cdot (yx^3)^{-1}}$

- A) $2x^6y^5$ B) $\frac{2y^6}{x^7}$
C) x^4 D) $16x^{23}y^5$

$$22) \frac{b^4 \cdot a^{-1}b^4}{(2b^3 \cdot 2ab^3)^4}$$

A) $2a^7b^9$

B) $\frac{8b^5}{a^4}$

C) $\frac{4b^3}{a^2}$

D) $\frac{1}{256a^5b^{16}}$

$$23) \frac{yx^2}{(x^2y^3)^3}$$

A) $\frac{1}{x^4y^8}$

B) $\frac{8y^{10}}{x^{12}}$

C) $\frac{y^{13}x^{10}}{8}$

D) $\frac{x^3}{y^8}$

$$24) \frac{2x}{(xy^2 \cdot y^4)^2}$$

A) $4x^8$

B) $\frac{y}{x^5}$

C) $\frac{x^2}{4y^{16}}$

D) $\frac{2}{xy^{12}}$

Factor each completely.

$$25) 5n^2 + 5n$$

A) $5n(n - 1)$

B) $5n(n + 1)$

C) $(n - 7)^2$

D) $(n + 1)(n + 10)$

$$26) 3x^2 + 3x - 60$$

A) $3(x + 2)(x - 10)$

B) $3(x + 4)(x + 5)$

C) $3(x + 10)(x - 2)$

D) $3(x - 4)(x + 5)$

$$27) 7x^2 + 10x$$

A) $x(7x + 10)$

B) $x(7x + 1)$

C) $x(7x - 10)$

D) $5(5x - 8)(x - 2)$

$$28) 3v^3 - 8v^2 - 60v$$

A) Not factorable

B) $3v(v + 10)(v + 2)$

C) $3v(v + 1)(v - 20)$

D) $v(3v + 10)(v - 6)$

$$29) 4r^2 + 35r - 9$$

A) $4(r + 9)(r + 1)$

B) $3r(3r + 1)$

C) $(2r + 1)(5r + 4)$

D) $(r + 9)(4r - 1)$

$$30) 18x^2 + 172x - 80$$

A) $2(x + 10)(9x - 4)$

B) $(9x + 10)(x - 4)$

C) $2(9x + 2)(x - 20)$

D) $2(x - 10)(9x + 4)$

$$31) 5n^2 - 5$$

A) $5(5n + 3)^2$

B) Not factorable

C) $5(n + 1)(n - 1)$

D) $25(n - 1)^2$

$$32) 16n^2 - 25$$

A) $(4n + 5)(4n - 5)$

B) $(4n - 5)^2$

C) $(n + 2)(n - 2)$

D) $(8n + 5)(8n - 5)$

33) $125x^3 - 1$

- A) $(5x - 1)^3$
 B) $(5x + 1)(25x^2 - 5x + 1)$
 C) $(5x - 1)(25x^2 + 5x + 1)$
 D) $(5x - 1)(5x + 1)$

34) $42x^3 + 7x^2 - 30x - 5$

- A) $(7x^2 + 1)(6x + 5)$
 B) $(7x^2 - 5)(6x + 1)$
 C) $(7x^2 + 1)(6x - 5)$
 D) $(7x^2 - 5)(6x - 1)$

Solve each equation by factoring.

35) $x^2 - 16 = 0$

- A) $\{-3, 8\}$ B) $\{4, -4\}$
 C) $\{2, 7\}$ D) $\{7, 0\}$

36) $v^2 - v - 20 = 0$

- A) $\{4, -4\}$ B) $\{4\}$
 C) $\{-3, 1\}$ D) $\{-4, 5\}$

37) $b^2 - 2b - 15 = 0$

- A) $\{-3, 5\}$ B) $\{3, -5\}$
 C) $\{6, 0\}$ D) $\{4, 8\}$

38) $x^2 - 7x + 10 = 0$

- A) $\{2, 5\}$ B) $\{-4, 0\}$
 C) $\{-4, 5\}$ D) $\{4, 0\}$

39) $p^2 - 2p - 15 = 0$

- A) $\{-5, 3\}$ B) $\{5, 0\}$
 C) $\{5, -3\}$ D) $\{2, -1\}$

40) $a^2 + 2a = 0$

- A) $\{2, 4\}$ B) $\{-7, 3\}$
 C) $\{-2, 0\}$ D) $\{8, 0\}$

Simplify each and state the excluded values.

41) $\frac{18b^2 + 90b}{36b^3}$

- A) $\frac{2b^2}{b+5}; \{0, -5\}$
 B) $7b - 3; \{-9\}$
 C) $\frac{2(b-1)}{9b}; \{0\}$
 D) $\frac{b+5}{2b^2}; \{0\}$

42) $\frac{9x^2 + 3x}{15x^2 + 15x}$

- A) $\frac{7}{7x-6}; \left\{7, \frac{6}{7}\right\}$
 B) $\frac{3(x+3)}{3x+1}; \left\{0, -\frac{1}{3}\right\}$
 C) $\frac{3x+1}{3(x+3)}; \{0, -3\}$
 D) $\frac{3x+1}{5(x+1)}; \{0, -1\}$

$$43) \frac{5p^2 - 48p - 20}{3p^2 - 29p - 10}$$

$$A) \frac{5p+2}{3p+1}; \left\{10, -\frac{1}{3}\right\}$$

$$B) \frac{7p+3}{2(p-5)}; \{5\}$$

$$C) 2; \{-10\}$$

$$D) \frac{2p-9}{5p-6}; \left\{4, \frac{6}{5}\right\}$$

$$44) \frac{-5a^2 + 52a - 20}{5a - 50}$$

$$A) \frac{-5a+2}{5}; \{10\}$$

$$B) \frac{5a+3}{2(a+2)}; \{-6, -2\}$$

$$C) \frac{3}{2(a+3)}; \{9, -3\}$$

$$D) \frac{7a-4}{5(a+2)}; \{-3, -2\}$$

$$45) \frac{1}{5b} \cdot \frac{5b-5}{b-1}$$

$$A) \frac{5b}{2}; \text{None} \quad B) 18b; \text{None}$$

$$C) \frac{b+7}{7}; \text{None} \quad D) \frac{1}{b}; \{0, 1\}$$

$$46) \frac{7n^3 - 21n^2}{5} \cdot \frac{n-6}{n^2 - 9n + 18}$$

$$A) \frac{n+10}{n-7}; \{7\} \quad B) \frac{7n^2}{5}; \{6, 3\}$$

$$C) \frac{3}{2n}; \{0\} \quad D) \frac{n+2}{n-7}; \{7\}$$

$$47) \frac{n+2}{9n+54} \div \frac{10-n}{n^2-4n-60}$$

$$A) \frac{n-10}{n+9}; \{-9\}$$

$$B) \frac{-n-2}{9}; \{-6, 10\}$$

$$C) \frac{n-6}{10n}; \{0\}$$

$$D) \frac{4}{5}; \text{None}$$

$$48) \frac{a^2 - 5a + 4}{9} \div \frac{7a^3 - 7a^2}{9}$$

$$A) \frac{a-1}{9}; \text{None}$$

$$B) \frac{a-4}{7a^2}; \{0, 1\}$$

$$C) \frac{7}{4a(a-2)}; \{0, 2\}$$

$$D) \frac{3(a-8)}{a+8}; \{-8\}$$

State the excluded values for each.

$$49) \frac{b^2 - 5b - 50}{b^2 - 18b + 80}$$

$$A) \{10, 8\} \quad B) \{8, -3\}$$

$$C) \{6, -6\} \quad D) \{10, -5\}$$

$$50) \frac{x^2 - 17x + 72}{x^2 - 10x + 9}$$

$$A) \{9, 8\} \quad B) \{8, 6\}$$

$$C) \{0, -3\} \quad D) \{9, 1\}$$