

Honors Calculus Summer Work

The following assignment is a review of algebraic techniques that you have learned in previous math courses and will need in calculus. There will be time for you to receive help and ask specific questions during the first few days of class, but you are expected to have the majority of the assignment completed before school begins. Around the fourth day of class there will be a quiz on the techniques covered in this assignment.

This assignment is split into 2 sections. Each section contains the following;

- a) Completed examples to refresh your memory and re-learn the content. Most students learn best by writing the steps out themselves. It is suggested that you re-work the examples on a separate sheet of paper to best review the material.
- b) A worksheet with practice problems for you to complete. You are required to show your work and any steps that lead to your answer.
- c) An answer key to the worksheet for you to check your work and identify the problems you will need to ask questions about.

The practice worksheets will be collected and graded.

- 1) Summer WS #1 (16 problems)**
- 2) Summer WS #2 (20 problems)**

You may do these problems a separate sheet of paper if you are unable to print the worksheets or need more space.

Honors Calculus Summer Work Part 1 Examples

Solve each equation.

1. $\frac{6x-7}{4} + \frac{3x-5}{7} = \frac{5x+78}{28}$ (Hint: Clear the fractions by multiplying both sides by the common denominator.)

$$\begin{aligned} 28 \left[\frac{6x-7}{4} + \frac{3x-5}{7} = \frac{5x+78}{28} \right] \\ 7(6x-7) + 4(3x-5) &= 5x+78 \\ 42x-49 + 12x-20 &= 5x+78 \\ 54x-69 &= 5x+78 \\ 49x &= 147 \\ \boxed{x=3} \end{aligned}$$

2. $3x^2 + 18x = 0$

$$\begin{aligned} 3x(x+6) &= 0 \\ 3x=0 \quad x+6 &= 0 \\ \boxed{x=0, x=-6} \end{aligned}$$

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

$$\begin{aligned} x^2 + 6x + 5 &= 0 \\ (x+5)(x+1) &= 0 \\ \boxed{x=-5, x=-1} \end{aligned}$$

4. $-x^2 + 6x - 8 = 0$

$$\begin{aligned} -(x^2 - 6x + 8) &= 0 \\ x^2 - 6x + 8 &= 0 \\ (x-4)(x-2) &= 0 \\ \boxed{x=4, x=2} \end{aligned}$$

5. $2y^2 + 9y + 7 = 0$

$$\begin{aligned} (2y+7)(y+1) &= 0 \\ \boxed{y=-\frac{7}{2}, y=-1} \end{aligned}$$

6. $n^2 = 9$

Two ways to do this:

$$\sqrt{n^2} = \sqrt{9}$$

$$\boxed{n = \pm 3}$$

or $n^2 - 9 = 0$

$$(n+3)(n-3) = 0$$

$$\boxed{n = -3, n = 3}$$

7. $2a^2 = 32$

$$a^2 = 16$$

$$\boxed{a = \pm 4}$$

or

$$2a^2 - 32 = 0$$

$$2(a^2 - 16) = 0$$

$$2(a+4)(a-4) = 0$$

$$\boxed{a = -4, a = 4}$$

Summer WS #1

Name _____

Honors Calculus

Solve each equation.

1. $2(x + 5) - 7 = 3(x - 2)$

2. $3(b + 3) = 5(1 - b) - 1$

3. $y - 3(2y + 3) = 8 - 5y$

4. $9x - 10 = 5x + 2(2x - 5)$

5. $\frac{5a}{4} + \frac{1}{2} = a - \frac{1}{2}$

6. $\frac{100-4x}{3} = \frac{5x+6}{4} + 6$

7. $6x^2 + 3x = 0$

8. $9x^2 - 1 = 0$

$$9. y^2 - 2y - 8 = 0$$

$$10. n^2 - 10n + 9 = 0$$

$$11. x^2 + 10x + 25 = 0$$

$$12. 4b^2 + 12b + 9 = 0$$

$$13. 3 + 5x - 2x^2 = 0$$

$$14. 2n^2 = 19n + 33$$

$$15. b^2 = 49$$

$$16. 9x^2 = 36$$

Summer WS #1

Name _____

Honors Calculus

Solve each equation.

1. $2(x + 5) - 7 = 3(x - 2)$

$x = 9$

2. $3(b + 3) = 5(1 - b) - 1$

$b = -\frac{5}{8}$

3. $y - 3(2y + 3) = 8 - 5y$

No solution

4. $9x - 10 = 5x + 2(2x - 5)$

All real numbers

5. $\frac{5a}{4} + \frac{1}{2} = a - \frac{1}{2}$

$a = -4$

6. $\frac{100 - 4x}{3} = \frac{5x + 6}{4} + 6$

$x = 10$

7. $6x^2 + 3x = 0$

$x = 0, x = -\frac{1}{2}$

8. $9x^2 - 1 = 0$

$x = \pm \frac{1}{3}$

$$9. y^2 - 2y - 8 = 0$$

$$y = 4, y = -2$$

$$10. n^2 - 10n + 9 = 0$$

$$n = 9, n = 1$$

$$11. x^2 + 10x + 25 = 0$$

$$x = -5$$

$$12. 4b^2 + 12b + 9 = 0$$

$$b = -\frac{3}{2}$$

$$13. 3 + 5x - 2x^2 = 0$$

$$x = -\frac{1}{2}, x = 3$$

$$14. 2n^2 = 19n + 33$$

$$n = -\frac{3}{2}, n = 11$$

$$15. b^2 = 49$$

$$b = \pm 7$$

$$16. 9x^2 = 36$$

$$x = \pm 2$$

Honors Calculus Summer Work Part 2 Examples

1. If $f(x) = 2x^2 - 3x + 4$, evaluate $f(2)$, $f(a)$, and $f(2+h)$.

$$\begin{aligned} f(2) &= 2 \cdot 2^2 - 3 \cdot 2 + 4 \\ &= 8 - 6 + 4 \\ &= \boxed{6} \end{aligned}$$

$$f(a) = \boxed{2a^2 - 3a + 4}$$

$$\begin{aligned} f(2+h) &= 2(2+h)^2 - 3(2+h) + 4 \\ &= 2(4 + 4h + h^2) - 6 - 3h + 4 \\ &= 8 + 8h + 2h^2 - 6 - 3h + 4 \\ &= \boxed{2h^2 + 5h + 6} \end{aligned}$$

Simplify. Write answers without negative exponents.

$$\begin{aligned} 2. (-2x)^2 \\ &= (-2)^2 \cdot x^2 \\ &= \boxed{4x^2} \end{aligned}$$

$$3. \frac{4x^5y^{-2}}{12x^2y^3} = \boxed{\frac{x^3}{3y^5}}$$

$$\begin{aligned} 4. \frac{(3a^{-2}b^3)^2}{27a^3b^4} &= \frac{9a^{-4}b^6}{27a^3b^4} \\ &= \boxed{\frac{b^2}{3a^7}} \end{aligned}$$

If the expression has a fractional exponent, rewrite it using a radical.

$$5. p^{\frac{1}{3}} = \boxed{\sqrt[3]{p}}$$

$$6. x^{\frac{5}{4}} = \boxed{\sqrt[4]{x^5}}$$

$$7. y^{\frac{1}{2}} = \frac{1}{y^{\frac{1}{2}}} = \boxed{\frac{1}{\sqrt{y}}}$$

If the expression has a radical, rewrite it using a fractional exponent.

$$8. \sqrt[3]{y} = \boxed{y^{\frac{1}{3}}}$$

$$9. \sqrt{x} = \boxed{x^{\frac{1}{2}}}$$

$$10. \sqrt[4]{r^7} = \boxed{r^{\frac{7}{4}}}$$

Summer WS #2

Name _____

Honors Calculus

(1 – 2) For each function, evaluate $f(2)$, $f(a)$, and $f(2 + h)$.

1. $f(x) = x^2 - x + 1$

2. $f(x) = 5x - x^2$

Simplify. Write answers without negative exponents.

3. $(4m)^3$

4. $(-4m)^3$

5. $-4m^{-3}$

6. $a^{-7} \cdot a^{-2} \cdot a^5$

7. $\frac{mn^4}{m^3n}$

8. $\frac{-24h^4k^{-6}}{8h^7k^9}$

9. $(x^4)^{-3}$

10. $\frac{5k^7}{15k^2}$

11. $(-3m^9)(4m^{-5})$

12. $\frac{(3y^5)^2}{(3y^{-3})^3}$

If the expression has a fractional exponent, rewrite it using a radical.

13. $x^{\frac{3}{4}}$

14. $y^{\frac{7}{2}}$

15. $n^{\frac{2}{5}}$

16. $(n^5)^{\frac{2}{3}}$

If the expression has a radical, rewrite it using a fractional exponent.

17. $\sqrt[3]{x}$

18. $\sqrt[8]{y}$

19. $\sqrt[4]{p^9}$

20. $\frac{1}{\sqrt[3]{p^2}}$

Summer WS #2

Name _____

Honors Calculus

(1 - 2) For each function, evaluate $f(2)$, $f(a)$, and $f(2 + h)$.

1. $f(x) = x^2 - x + 1$

$$\begin{aligned} f(2) &= 3 \\ f(a) &= a^2 - a + 1 \\ f(2+h) &= h^2 + 3h + 3 \end{aligned}$$

2. $f(x) = 5x - x^2$

$$\begin{aligned} f(2) &= 6 \\ f(a) &= 5a - a^2 \\ f(2+h) &= 6 + h - h^2 \end{aligned}$$

Simplify. Write answers without negative exponents.

3. $(4m)^3 = 64m^3$

4. $(-4m)^3 = -64m^3$

5. $-4m^{-3} = \frac{-4}{m^3}$

6. $a^{-7} \cdot a^{-2} \cdot a^5 = \frac{1}{a^4}$

7. $\frac{mn^4}{m^3n} = \frac{n^3}{m^2}$

8. $\frac{-24h^4k^{-6}}{8h^7k^9} = \frac{-3}{h^3k^{15}}$

9. $(x^4)^{-3} =$

$$\frac{1}{x^{12}}$$

10. $\frac{5k^7}{15k^2}$

$$\frac{k^5}{3} \text{ or } \frac{1}{3}k^5$$

11. $(-3m^9)(4m^{-5})$

$$-12m^4$$

12. $\frac{(3y^5)^2}{(3y^{-3})^3}$

$$\frac{y^{10}}{3} \text{ or } \frac{1}{3}y^{10}$$

If the expression has a fractional exponent, rewrite it using a radical.

13. $x^{\frac{3}{4}}$

$$\sqrt[4]{x^3}$$

14. $y^{\frac{7}{2}}$

$$\sqrt{y^7}$$

15. $n^{\frac{2}{5}}$

$$\sqrt[5]{n^2}$$

16. $(n^5)^{\frac{2}{3}}$

$$\sqrt[3]{n^{10}}$$

If the expression has a radical, rewrite it using a fractional exponent.

17. $\sqrt[3]{x}$

$$x^{\frac{1}{3}}$$

18. $\sqrt[6]{y}$

$$y^{\frac{1}{6}}$$

19. $\sqrt[4]{p^9}$

$$p^{\frac{9}{4}}$$

20. $\frac{1}{\sqrt[3]{p^2}}$

$$p^{-\frac{2}{3}}$$