Desert Mountain H. S. Math Department

Summer Work Packet

Honors/AP/IB level math courses at Desert Mountain are for students who are enthusiastic learners of mathematics and whose work ethic is of the highest standard. These students are expected to arrive "ready to go" on the first day of school.

The attached packet is designed to help you review concepts with which you should already be familiar. It is recommended that you complete some of the problems from the packet at the beginning of the summer when the concepts are still fresh, and then complete the remainder of the problems near the beginning of the school year. **This is an optional review** and if you do not complete it, your grade will not be affected directly, however, the material in the packet has been taught in your previous math classes and will be assumed to be fully understood by you.

Some suggestions for the presentation and completion of mathematics assignments at DMHS are listed below. If you adhere the these guidelines with your summer work, you will be ready to meet the expectations of your mathematics teacher during the school year.

- Use notebook paper or plain white paper if extra paper is needed
- All work should be neat and legible
- Neatly place completed work in a small binder or folder with brads
- Use pencil, erase completely when needed
- Work the problems in order and clearly indicate section and problem numbers if working on a separate sheet of paper
- Begin new sections on a new piece of paper

Solving Second-Degree Equations-Factoring

You should be able to identify a second-degree equation of the type $ax^2+bx+c=0$ with $a\neq 0$. Also, you should expect at most two different real solutions. To find the solutions you should:

1. Write the equation in standard form.
2. Factor the left side.
3. Set each factor equal to 0.
4. Solve the new equations from step 3.
5. Write your solution using set notation. For example, $x=\{-2,3\}$.

EXERCISES

Solve for the variable:

1. $x^2+5x-14=0$
2. $x^2+13x+30=0$
3. $x^2-x+7=0$
4. $4x^2+8x+4=0$
5. $x^2+5x=0$
6. $x^2+2x=8$
7. $2t^2+20t+50=0$
8. $5x^2-5x=0$
9. $2x^2+6=7x$
10. $2x^2+8x+6=0$
11. $z^2+4z-21=0$
12. $10x-10=19x-x^2$
13. $3x^2+2x=0$
14. $2-2x^2=0$
15. $2w^2+7w-4=0$
16. $2x^2+7x-15=0$
17. $10a^2-a-3=0$
18. $2x^2-5x-3=0$
19. $81x^2-144=0$
20. $12x^2+5x-2=0$

EXERCISES

Solve for *x*. If there are no solutions or infinite solutions, indicate so and explain how you know.

1. $-2\left[x-\left(4x-5\right)\right]=5x$
2. $1-2\left[4-\left(3x-5\right)\right]=3x+1$
3. $1-\left[x-\left(1-x\right)\right]=0$
4. $2\left[x+4-3\left(2x-1\right)\right]=3\left(4-3x\right)+2-x$
5. $\left\{\left[x-2\left(x+1\right)+2\right]+4\right\}=4$
6. $12x+4-\left[\left(3-x\right)-\left(5x+7\right)\right]=13$
7. $2-3\left\{2x-2\left[1-\left(2x+1\right)\right]+x\right\}=23$
8. $x-\frac{x+2}{2}=3x-\left(1+2x\right)-\frac{x}{2}$
9. $2x-\left\{1-\left[x-\left(3-2x\right)\right]\right\}=5x-4$
10. $20-\left\{\left[3x-\left(x-1\right)\right]-5x\right\}=0$

EXERCISES

Solve for *x*:

1. $1=\frac{5}{x}$
2. $\frac{x-3}{2}=\frac{2x+4}{5}$
3. $\frac{6}{x-2}=-3$
4. $\frac{3x-3}{x-1}=2$
5. $\frac{x}{2}=\frac{x+6}{5}$
6. $\frac{3}{x}=\frac{4}{x-2}$
7. $\frac{4}{x+3}=\frac{1}{x-3}$
8. $\frac{5-2x}{x-1}=-2$
9. $\frac{x+3}{x-2}=2$
10. $\frac{2}{x}+\frac{3(x-1)}{5x}=1$
11. $5+\frac{3+x}{x}=\frac{5}{x}$
12. $\frac{4}{x-2}-\frac{1}{x}=\frac{5}{x-2}$

EXERCISES

Solve for *a*:

1. $\frac{2ax}{3c} = \frac{y}{m}$

2. $2cy + 4d = 3ax - 4b$

3. $ax + 4a = bx + 7c$

4. $3(x - a) = 2a - x - \frac{b - x}{c}$

5. $a(x + 2) = \pi - cy$

6-10. Now solve each of the above equations for *x*.

EXERCISES

Solve for *x*. Then graph the solution for each problem on a number line:

1. $10 + 2x \le 12$
2. $4 - (12 - 3x) \le -5$
3. $5x < 22 - (2x + 1)$
4. $4x + (3x - 7) > 2x - (28 - 2x)$
5. $5 - 3x \le 23$
6. $3x + 4(x - 2) \ge x - 5 + 3(2x + 1)$
7. $3x - 2(5x + 2) > 1 - 5(x - 1) + x$
8. $3x - 2(x - 5) < 3(x - 1) - 2x - 11$
9. $3x + 4(x - 2) + 7 > x - 5 + 3(2x - 1)$
10. $5x - 2(3x - 4) > 4[2x - 3(1 - 3x)]$

EXERCISES

Simplify:

1. $(3y)^2 \cdot (2y)^3$

2. $3x^0$

3. $x^2(x^3)^4$

4. $\left(\dfrac{a^2b^3cd^5}{3x^2w^0}\right)^7$

5. $\dfrac{(2ab)^2}{(3x^3)^2}$

6. $(3x^5)^2(2x^3)^3$

7. $(x^2y)(xy^2)$

8. $2(3ab^2)^2$

9. $(-4c)^2$

10. $\left(\dfrac{xyz^2}{5a}\right)^3$

11. $(-2abc)(bcd)(3abc^2)$

12. $(2x^2yz)(-5xz)^2(xyz^2)^3$

EXERCISES

Solve:

1. The hypotenuse of a right triangle is 7, and a side adjacent to it is 3. Find the length of the third side.

2. Two sides of a triangle are 1 and 2. Find the length of the hypotenuse.

3. If the hypotenuse of a 30°-60°-90°-degree triangle is 10, find the lengths of the other two sides.

4. If the side opposite the 60° angle in a right triangle is 5, what are the lengths of the other two sides?

5. If the side opposite the 30° angle in a right triangle is 1, what are the lengths of the other two sides?

6. If the side opposite the 45° angle in a right triangle is 6, what are the lengths of the other two sides?

7. If the hypotenuse of an isosceles right triangle is 10, what are the lengths of the other two sides?

8. A ladder 20 ft long is resting against a house. If it makes an angle of 45° with the ground, how high up does it reach?

9. An observer notes that the angle of elevation of the top of a neighboring building is 60°. If the distance from the observer to the neighboring building is 40 ft, how tall is the building?

10. When the sun is 30° above the horizon, an observer's shadow is 9 ft. How tall is the observer?

Operations with Fractions

Understanding the logical, sequential process of operations with fractions is an important prerequisite to Algebra II Honors. This process is used at a higher level in simplifying and solving rational expressions and equations - a major component of Algebra II Honors.

For the given problems in this section of your review, you will show work for every step of the problem. Next to every step, you will give a *brief* written statement describing the process. Calculators are not to be used for this section. Please refer to the example below for assistance.

Example:

$\frac{4}{7}+\frac{1}{2}$	Find the least common denominator (the smallest value that both denominators divide into evenly) of 7 and 2, as adding fractions requires a common denominator. LCD = 14
$\left(\frac{2}{2}\right)\frac{4}{7}+\frac{1}{2}\left(\frac{7}{7}\right)$	Produce equivalent fractions by multiplying by the identity, a form of one. a) Multiply 4/7 by 2/2 b) Multiply ½ by 7/7
$\frac{8}{14}+\frac{7}{14}$	Simplify
$\frac{15}{14}$	Add the numerators, keeping the denominators the same. Don't forget to reduce if possible.

See next page for problems…

EXERCISES

Perform the indicated operation:

1. $\frac{3}{8}+\frac{1}{5}$

2. $1\frac{9}{10}+4\frac{2}{3}$

3. $2\frac{5}{6}+1\frac{1}{2}$

4. $\frac{24}{11}-\frac{2}{11}$

5. $4\frac{4}{5}-2\frac{1}{2}$

6. $3\frac{1}{7}-1\frac{5}{14}$

7. $\frac{4}{9}\times\frac{2}{3}$

8. $\frac{1}{8}\times\frac{4}{5}$

9. $6\frac{1}{2}\times1\frac{1}{13}$

10. $\frac{7}{8}\div\frac{1}{4}$

11. $2\frac{1}{4}\div3\frac{2}{3}$

12. $7\div3\frac{1}{2}$