Math 1021 – Beginning of the Semester Review

Evaluate problems 1-5 if possible:

1. $(-3)^4$
2. -3^4
3. $-\sqrt{64}$
4. $\sqrt[3]{-64}$
5. $\sqrt[6]{-64}$

In 6 – 9, fill in the blanks to make each statement true.

6. To compute $a+b$ when a and b are unequal and have opposite signs, we _____.

7. When there is a minus sign before parentheses, the parentheses can be removed by _____ of each term inside the parentheses.

8. The subtraction $a-b$ is equal to the addition _____.

9. The division a/b is equal to the multiplication _____.

In 10 – 15, evaluate each of the following.

10. $-7+(-2)$
11. $-4+(-4)$
12. $5-(-8)$
13. $3+(-8)$
14. $(-3)(-5)$
15. $\dfrac{24}{-6}$

In 16 – 20, express each of the following without parentheses or brackets.

16. $-(-x-7)$
17. $-(6-y)$
18. $-[-(-x)-(-y)]$
19. $(-4)b$
20. $[-(-5)](-y)$

21. Which of the following is a linear function?

a. $x^2 = y - 2$
b. $3x + 2y = 7$
c. $x^3 - y = 4$
d. $y = 11 - 3x$
e. $x - 2 = 4$
f. $y = |x - 5|$

In 22 – 28, simplify each of the following. **Express answers in terms of positive exponents.**

22. $\left(2^2\right)^4$

23. $7^2 \cdot 7^3 \cdot 7^5$

24. $(-5)(-5)^2(-5)^3$

25. $x^2 \cdot x \cdot x^3 \cdot x \cdot x^4 \cdot x$

26. $\left[\left(4^2\right)^3\right]^4$

27. $(2ab)^6$

28. $\left(a^2b\right)^5(ac)^3\left(b^2c^3\right)^{-4}(ab)^2$

29. Determine whether the graphs of the equations are parallel lines, perpendicular lines, or neither. Show work justifying your responses.

a. $3x - 8y = 14$
$32x + 12y = 14$

b. $y = 4x - 4$
$16x + 4y = 6$

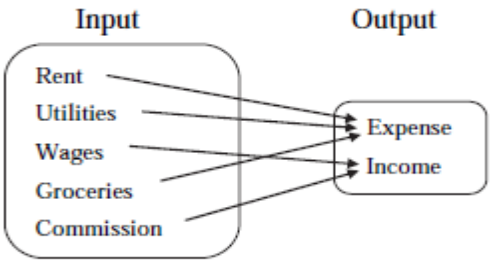
30. Find the domain and range of each relation. Determine whether each relation is a function.

a. $\{(0,3),\ (1,1),\ (2,2),\ (1,-2)\}$

b. $\{(-4,3),\ (-2,2),\ (0,1),\ (2,0)\}$

c. $\{(5,3),\ (7,3),\ (4,2),\ (-1,2)\}$

d.



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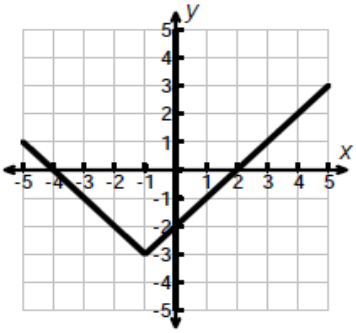

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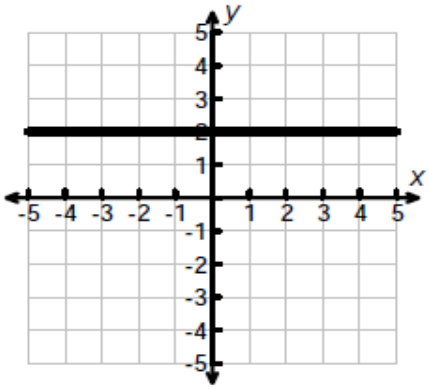

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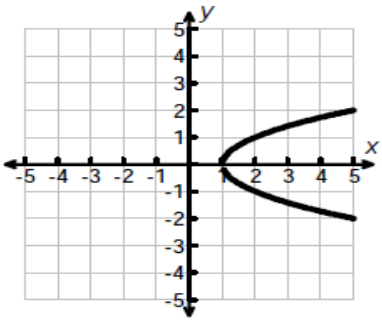

31. Find the value(s) of the variable for which the following are defined. State the domain of each function using interval notation.

a. $R(x) = \frac{3x-5}{x+3}$ b. $Q(x) = \frac{x^2-36}{x^2-5x-24}$

32. Add.

(a) $\frac{13}{15}+\frac{3}{15}$ (b) $\frac{3}{10}+\frac{8}{15}$ (c) $\frac{5x}{3x+1}+\frac{4x}{3x+1}$ (d) $\frac{4}{t}+\frac{6}{t+2}$

(e) $\frac{4}{x^2-16}+\frac{x+2}{x^2+4x}$

33. Subtract.

(a) $\frac{12}{5}-\frac{2}{5}$ (b) $\frac{11}{12}-\frac{3}{8}$ (c) $\frac{3b}{3b+2}-\frac{4b}{3b+2}$ (d) $\frac{4}{k}-\frac{6}{k+2}$

(e) $\frac{x}{4x+16}-\frac{4}{x^2+4x}$

34. Multiply and simplify.

(a) $\frac{15}{16}\cdot\frac{8}{5}$ (b) $\frac{15}{4}\cdot\frac{3}{4}$ (c) $\frac{3m^2n}{9x^2y}\cdot\frac{27x^4y^3}{6mn}$ (d) $\frac{8x^2-4x}{2x^2+5x-3}\cdot\frac{x^2-9}{2x}$

35. Divide and simplify.

(a) $\frac{3}{4}\div\frac{3}{7}$ (b) $\frac{1}{20}\div\frac{1}{5}$ (c) $\frac{12x^5y^4}{7a^3b^2}\div\frac{4x^2y}{21a^2b}$ (d) $\frac{x+3}{x-3}\div\frac{x^2+6x+9}{x^2-6x+9}$

36. Combine like terms.

(a) $-8+11a-5b+6a-7b-7$ (b) $8x-5x+6+3y-2y-4$

37. Find the x - and y -intercepts for the graphs of the following equations, then graph them.

(a) $x-2y=5$ (b) $2x+3y=6$ (c) $y=\frac{2}{3}x-1$

38. Solve the following equations.

(a) $7x+7=-14$ (b) $(z+5)-7=(z-7)+5$

(c) $-(y+5)-(2+7y)+8y=3y-8$ (d) $-8b+6+6b=-3b+11+b$

(e) $-\frac{1}{2}(2x-4)=\frac{3}{5}(5x-10)$ (f) $\frac{x}{3}+\frac{2-3x}{6}=\frac{5}{18}$

39. Solve the equations.

(a) $x(x-4)=0$
(b) $\left(\frac{3}{8}z\right)\left(z-\frac{1}{3}\right)=0$
(c) $y^2=4y+12$
(d) $6x^2-7x=5$
(e) $3b^3-9b^2=54b$
(f) $a(3a+16)=-16$
(g) $x^3+4x^2=x+4$

40. Write an expression for the difference of 4 and the quotient of x and 6.

41. Check to see if -1 is a solution of the equation: $3x^2-2x=-5x$.

42. Solve the following inequalities, express solution in interval notation:

(a) $-13+x>-12$
(b) $-3(4-2x)\le 18$
(c) $-4<2x+5<19$
(d) $\frac{1}{6}<\frac{4x-3}{3}\le\frac{4}{5}$

43. Write the equation of the line using the information given in the indicated form.

(a) $m=\frac{1}{4}$; $y-$intercept is -3; slope-intercept form

(b) $m=-\frac{3}{7}$; $y-$intercept $(0,5)$; general form

(c) Through the points $(2,-6)$ and $(-3,-5)$; slope-intercept form

(d) Through the points $(3,2)$ and $(4,5)$; general form

44. Factor completely the following polynomials:

(a) $x^2-12x+35$ (b) $2y^3-22y^2+48y$ (c) $6y-18$ (d) x^2-81
(e) $4x^2y^3-12x^3y^2$ (f) $10a^2-19a+6$ (g) $-4x^2+64$
(h) $3x(6x-5)-4(6x-5)$

45. Perform the indicated operation and simplify:

(a) $\left(3x^2-8x+2\right)+\left(4x^2-2x-9\right)$ (b) $\left(-5x^2+7x-9\right)-\left(-2x^2-8x+6\right)$

(c) $-3x^3\left(2x^4+5x-7\right)$ (d) $\left(3x-5\right)\left(4x+7\right)$

(e) $\left(7x-4\right)^2$ (f) $\left(\frac{1}{7}x^8\right)\left(-\frac{1}{4}x^2\right)$

(g) $\left(\frac{1}{7}x^8\right)\left(-\frac{1}{4}x^2\right)$ (h) $(x-7)(2x^2+3x-4)$

46. Simplify the following roots:

(a) $\sqrt{18a^9}$ (b) $\sqrt[3]{64p^7q^{10}}$ (c) $\sqrt[5]{32x^5}$ (d) $\sqrt{\frac{15x^{27}}{y^{15}}}$ (e) $\frac{\sqrt[5]{96a^{12}b^4}}{\sqrt[5]{3a^2b^{-4}}}$