

ALGEBRA II

FINAL EXAM REVIEW PACKET

[CHAPTER 1]

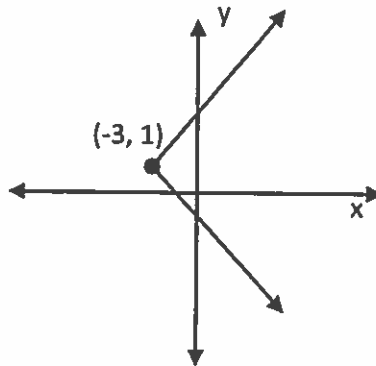
Determine whether each relation is a function (yes or no), then find its domain and range.

1) $\{(2,-2),(-1,0),(-2,9)\}$

yes/no

$D = \underline{-2, -1, 2}$ $R = \underline{-2, 0, 9}$

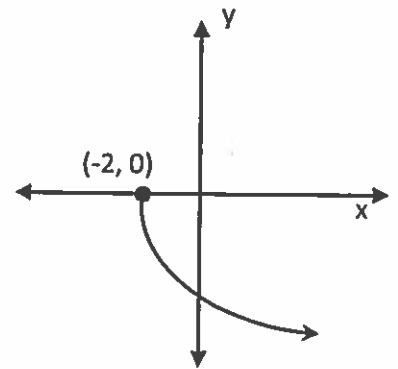
2)



yes/no

$D = \underline{x \geq -3}$ $R = \underline{\mathbb{R}}$

3)



yes/no

$D = \underline{x \geq -2}$ $R = \underline{y \leq 0}$

Given the function: $f(x) = 2x^2 + 1$, find:

4) $f(-3) = 2(-3)^2 + 1$
 $= 19$

5) $f(b+1) = 2(b+1)^2 + 1$
 $2(b+1)(b+1) + 1$
 $2(b^2 + 2b + 1) + 1$
 $2b^2 + 4b + 2 + 1$
 $= 2b^2 + 4b + 3$

Find the slope for each problem.

6) $y = -6x - 11$
 \uparrow
 $m = -6$

7) passes thru $(1, -4)$ & $(-2, 7)$

$\frac{7 - (-4)}{-2 - 1} = \frac{11}{-3}$
 $m = -11/3$

8) Is perpendicular to the line with equation: $3y + 5 = 2x$

$3y = 2x - 5$
 $y = \frac{2}{3}x - \frac{5}{3}$

$\perp m = -3/2$

Write an equation in slope-intercept form ($y = mx + b$) for the line described.

9) slope = 2, passes thru $(1, 3)$

$y = mx + b$
 $y = 2x + b$ $y = 2x + 1$
 $3 = 2(1) + b$
 $1 = b$

10) parallel to $y + 3x = -1$, passes thru $(-9, -2)$

$y = -3x - 1$ $y = -3x + b$
 $m = -3$ $-2 = -3(-9) + b$
 $-2 = 27 + b$
 $-29 = b$

$y = -3x - 29$

Use the following equation: $-4y = 7x + 12$, to find...

11) x-intercept?
 $0 = 7x + 12$
 $-12 = 7x$
 $-\frac{12}{7} = x$

12) y-intercept?
 $-4y = 7(0) + 12$
 $-4y = 12$
 $y = -3$

13) standard form
 $-4y = 7x + 12$
 $-7x - 4y = 12$
 $7x + 4y = -12$

[CHAPTER 2]

Solve each system of equations.

$$\begin{aligned}
 14) \quad & y = 2x - 5 & x &= 3 \\
 & 4y - x = 1 & & \\
 & 4(2x - 5) - x = 1 & y &= 2(3) - 5 \\
 & 8x - 20 - x = 1 & & y = 1 \\
 & 7x - 20 = 1 & & \\
 & 7x - 20 = 1 & & \\
 & 7x = 21 & & (3, 1)
 \end{aligned}$$

$$\begin{aligned}
 15) \quad & 4x + 7y = -1 & & \\
 & 2x + y = 7 & & \\
 & \downarrow & & \\
 & y = -2x + 7 & & y = -2(5) + 7 \\
 & 4x + 7(-2x + 7) = -1 & & y = -3 \\
 & 4x - 14x + 49 = -1 & & \\
 & -10x + 49 = -1 & & (5, -3) \\
 & -10x = -50 & & \\
 & x = 5 & &
 \end{aligned}$$

[CHAPTER 3]

Simplify.

$$\begin{aligned}
 16) \quad & 3(2x - 8) - (7 - 5x) \\
 & 6x - 24 - 7 + 5x \\
 & 11x - 31
 \end{aligned}$$

$$\begin{aligned}
 17) \quad & (3y - 4)^2 \\
 & (3y - 4)(3y - 4) \\
 & 9y^2 - 24y + 16
 \end{aligned}$$

$$\begin{aligned}
 18) \quad & (5x^4)^2 (x^3 y^2)^3 \\
 & 25x^8 x^{-9} y^3 \\
 & \frac{25x^8 y^3}{x^9} = \frac{25y^3}{x}
 \end{aligned}$$

Divide using synthetic division.

$$19) \quad (2x^3 - 4x + 9) \div (x + 2)$$

$$\begin{array}{r|rrrr}
 -2 & 2 & 0 & -4 & 9 \\
 & & -4 & 8 & -8 \\
 \hline
 & 2 & -4 & 4 & 1
 \end{array}$$

$$2x^2 - 4x + 4 + \frac{1}{x+2}$$

What is the degree and leading coefficient for...

$$20) \quad f(x) = 2x^3 - 10x + 5 - x^4 + 7x^2$$

$$\text{degree} = \underline{4}$$

$$\text{leading coefficient} = \underline{-1}$$

[CHAPTER 4]

Factor completely.

$$21) \quad 8y^3 - 27$$

$$(2y - 3)(4y^2 + 6y + 9)$$

$$22) \quad 25d^2 - 4$$

$$(5d - 2)(5d + 2)$$

$$23) \quad 3x^3 - 6x^2 - 45x$$

$$3x(x^2 - 2x - 15)$$

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

[CHAPTER 5]

Simplify the complex number problems.

$$24) \quad (11 - 2i) - (6i - 9)$$

$$11 - 2i - 6i + 9$$

$$20 - 8i$$

$$25) \quad (8 - 3i)^2$$

$$(8 - 3i)(8 - 3i)$$

$$64 - 48i + 9i^2$$

$$64 - 48i - 9$$

$$55 - 48i$$

$$26) \quad i^{327}$$

$$327 \div 4$$

$$\text{Remainder} = 3$$

$$i^{327} = i^3 = -i$$

Solve each quadratic equation by factoring (27), complete the square (28) or the quadratic formula (29).

27) $y^2 - 2y - 63 = 0$

$$(y-9)(y+7) = 0$$

$$y = 9, y = -7$$

28) $x^2 + 6x - 1 = 0$

$$x^2 + 6x + 9 = 1 + 9$$

$$(x+3)^2 = 10$$

$$x+3 = \pm\sqrt{10}$$

$$x = -3 \pm \sqrt{10}$$

29) $7k^2 = 4k + 1 \quad 7k^2 - 4k - 1 = 0$

$$= \frac{4 \pm \sqrt{(-4)^2 - 4(7)(-1)}}{2(7)}$$

$$= \frac{4 \pm \sqrt{16 + 28}}{14}$$

$$= \frac{4 \pm \sqrt{44}}{14} = \frac{2 \pm \sqrt{11}}{7}$$

Use the equation $y = -\frac{2}{3}(x+5)^2 - 6$ to determine the following:

30) vertex = ?

$$(-5, -6)$$

31) axis of symmetry = ?

$$x = -5$$

32) direction of opening
(up or down)

down

[CHAPTER 6]

Solve by factoring.

Use the graph below to answer 34-36.

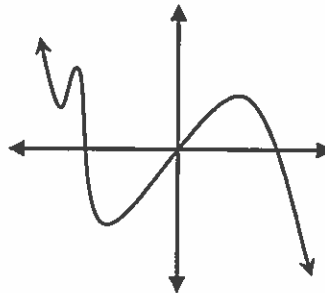
33) $2x^4 - 32x^2 = 0$

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

$$2x^2(x-4)(x+4) = 0$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$x = 0 \quad x = 4 \quad x = -4$$



34) Is the degree even or odd? odd

35) How many real zeros? 3

36) What is its end behavior? $(+\infty, -\infty)$

Use the rational root theorem to list all the possible p's & q's for the given function.

37) $f(x) = 4x^3 - 9x - 10$ p: $\frac{\pm 1, 2, 5, 10}{\text{(factors of 10)}}$ q: $\frac{\pm 1, 2, 4}{\text{(factors of 4)}}$ p/q: $\frac{\pm 1, 2, 5, 10, 1/2, 5/2, 5/4, 10/4}{\text{(factors of 40)}}$

[CHAPTER 7]

Give the inverse for each function.

38) $f = \{(0, -9), (-1, -1), (0.8, 12), (-2, 11)\}$

$$f^{-1} = \{(-9, 0), (-1, -1), (12, 0.8), (11, -2)\}$$

39) $f(x) = 6x + 8$

$$y = 6x + 8 \quad \text{switch } x \text{ \& } y$$

$$x = 6y + 8$$

$$x - 8 = 6y$$

$$\frac{x}{6} - \frac{8}{6} = y$$

$$y^{-1} = \frac{x}{6} - \frac{4}{3}$$

[CHAPTER 8]

Simplify the radical problems.

40) $4\sqrt[3]{16}$
 $4 \sqrt[3]{8} \sqrt[3]{2}$
 $4 \cdot 2 \sqrt[3]{2}$
 $= 8\sqrt[3]{2}$

41) $5\sqrt{8} - 6\sqrt{50} + 4\sqrt{18}$
 $5\sqrt{4}\sqrt{2} - 6\sqrt{25}\sqrt{2} + 4\sqrt{9}\sqrt{2}$
 $5(2)\sqrt{2} - 6(5)\sqrt{2} + 4(3)\sqrt{2}$
 $10\sqrt{2} - 30\sqrt{2} + 12\sqrt{2}$
 $= -8\sqrt{2}$

42) $\sqrt[5]{64j^{12}k^7}$
 $2j^2|k|\sqrt[5]{k}$

43) $(3+\sqrt{5})(2+2\sqrt{5})$

3	6	$6\sqrt{5}$	$= 6 + 8\sqrt{5} + 10$
$\sqrt{5}$	$2\sqrt{5}$	$2\sqrt{25}$	

44) Solve the equation:
 $(\sqrt{3x-2})^2 = 5^2$
 $3x - 2 = 25$
 $3x = 27$
 $x = 9$

45) Solve the inequality:
 hint: don't forget the "and"
 $\sqrt{x+7} - 3 \geq 8$
 $\sqrt{x+7} \geq 11$ and $x+7 \geq 0$
 $x \geq -7$
 $x+7 \geq 121$
 $x \geq 114$

$\{x \geq 114\}$

Change from radical form to an expression using a rational (fraction exponent) Multiply or divide the rational expressions.

46) $\sqrt[3]{125wx^6y^4}$
 $= 5w^{1/3}x^2y^{4/3}$

Evaluate.

47) $36^{1/2} \cdot 16^{-1/4}$
 $= \sqrt{36} \cdot \frac{1}{\sqrt[4]{16}}$
 $= 6 \cdot \frac{1}{2}$
 $= 3$

[CHAPTER 9]

Simplify the rational expressions.

48) $\frac{1}{9d} \cdot \frac{81c^2}{49a^2b}$
 $= \frac{9c}{7a}$

49) $\frac{x^2 - y^2}{a^2 - b^2} \div \frac{x - y}{a + b}$
 $\frac{(x-y)(x+y)}{(a-b)(a+b)} \cdot \frac{a+b}{x-y}$
 $= \frac{x+y}{a-b}$

50) $\frac{2-x}{3v^2} \cdot \frac{9v^3}{x-2}$
 $\frac{(-1)(x-2)}{3v^2} \cdot \frac{9v^3}{x-2}$
 $= \frac{-3v}{1}$ or $-3v$

Add, subtract or solve.

51) $(-1) \frac{x+2}{x-1} + \frac{6}{7x-7}$
 $(-1) \frac{x+2}{7(x-1)} + \frac{6}{7(x-1)}$
 $= \frac{7x + 14 + 6}{7(x-1)}$
 $= \frac{7x + 20}{7(x-1)}$

52) $(2b) \frac{7}{5a} - \frac{10}{3b(5a)}$
 $(2b) \frac{7}{5a} - \frac{10}{15ab}$
 $\frac{21b - 10}{15ab}$

53) (a) $\frac{a-5}{1} = \frac{4}{1}(a)$
 $a = 5$
 $a^2 - 5 = 4a$
 $a^2 - 4a - 5 = 0$
 $(a-5)(a+1) = 0$
 $a = -1$

Name the restrictions (excluded values) for 54-55.

54) $\frac{1}{x} + \frac{x-2}{x+2} = \frac{8}{3x-4}$

$x \neq 0, -2, 4/3$

55) $\frac{2b}{b^2-15b+56} = \frac{5}{3b^2-19b-14}$
 $(b-8)(b-7) \quad (3b+2)(b-7)$

$b \neq 7, 8, -2/3$

Solve 56.

56) ~~$\frac{1}{x+1} = \frac{x+6}{x^2}$~~

$x^2 = (x+1)(x+6)$

$x^2 = x^2 + 7x + 6$

$0 = 7x + 6$

$-6 = 7x$

$-6/7 = x$

[CHAPTER 10]

Solve the logarithmic or exponential equations.

57) $9^{x-1} = 27^{2x+3}$

~~$(3^2)^{x-1} = (3^3)^{2x+3}$~~

$2x-2 = 6x+9$

$-11 = 4x$

$-11/4 = x$

58) $\log_2(\frac{1}{4}) = n$

$2^n = \frac{1}{4}$

$2^n = 2^{-2}$

$n = -2$

59) $\log_7 x - \log_7 9 = \log_7 5$

~~$\log_7 \frac{x}{9} = \log_7 5$~~

~~$\frac{x}{9} = 5$~~

~~$x = 45$~~

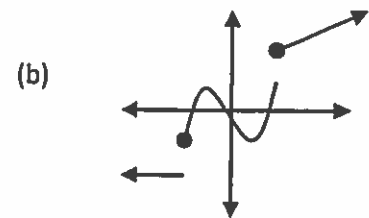
$\frac{x}{9} = \frac{5}{1}$ cross mult
 $x = 45$

[IN GENERAL]

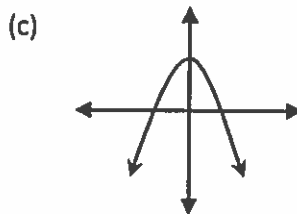
Match the name of the function on the left with the equation or graph shown to the right.

60) f Direct variation

(a) $f(x) = \frac{x}{2x-1}$



61) g Absolute value



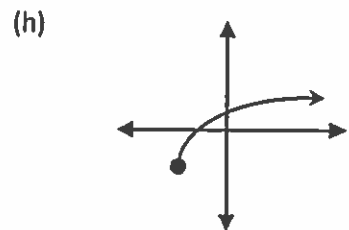
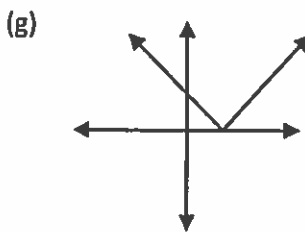
(d) $f(x) = [x] - 3$

62) b Piecewise

(e) $f(x) = -2$

(f) $f(x) = -2x + 9$

63) d Greatest Integer



64) c Quadratic

65) a Rational

66) h Square root

67) e Constant