Math 372

Summer ~~Fall~~ 2024 5

Exam 1, June 30

No books, notes, scratch paper, phones.
Please show all your work and clearly mark your answers.
Problems are 6 points each except as noted.
If a problem is too hard, move on to an easier one.
No Calculators.

Page	Pts	Possible
1		20
2		22
3		26
4		18
5		14
Total		100

Name (printed): Key

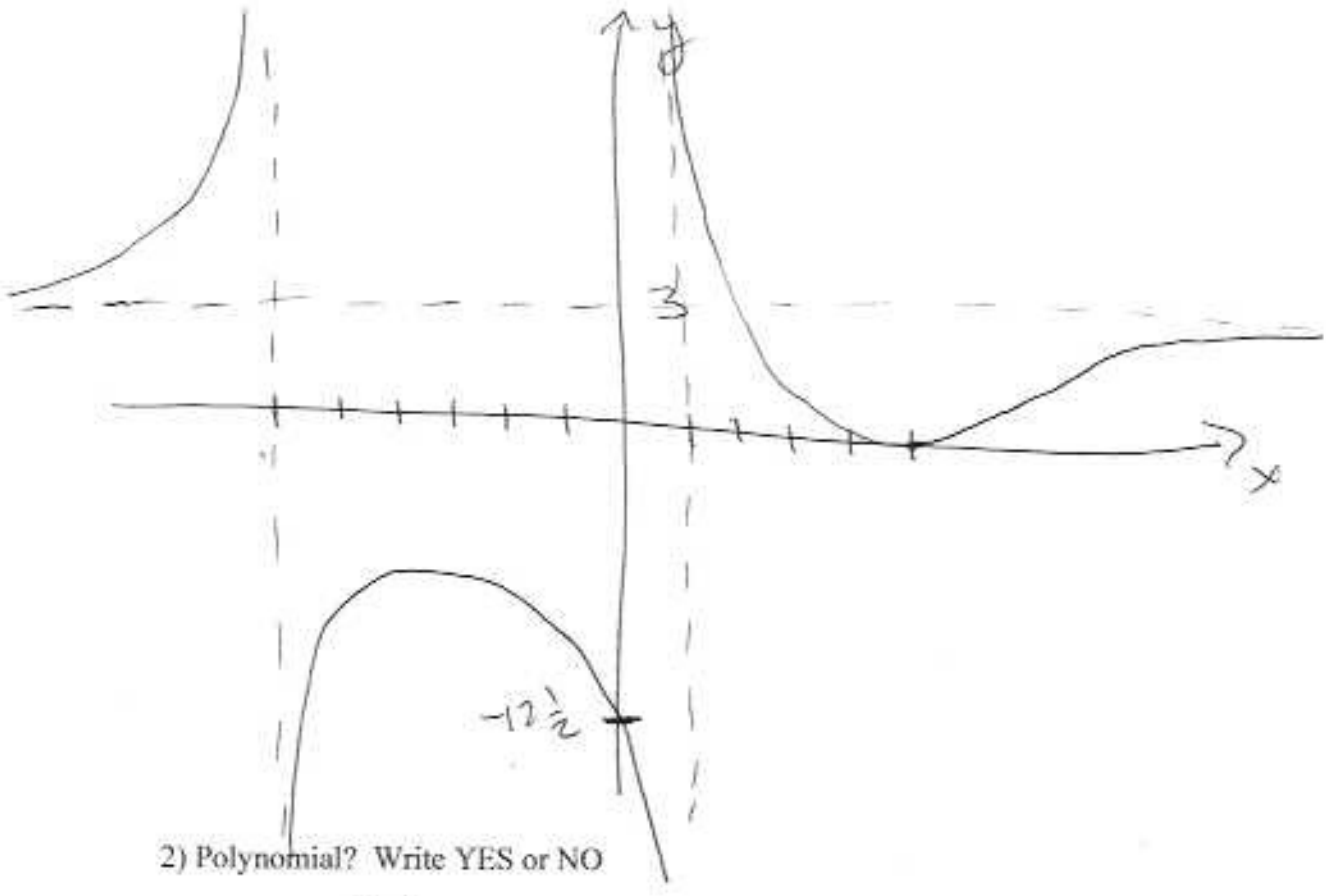
Name (signature): _____

Score for the class so far: _____ out of _____ points

Percent: _____ % Approximate letter grade:

1) Graph: (8 pts)

$y = \frac{3(x-5)^2}{(x+6)(x-1)}$ y-int $= -12\frac{1}{2}$ H.A.: $y = 3$



2) Polynomial? Write YES or NO

a) $6x - 18$ Yes

b) $\frac{6}{x} - 18$ No

c) $6\sqrt{x} - 18$ No

d) $x^6 - 18$ Yes

e) 6 Yes

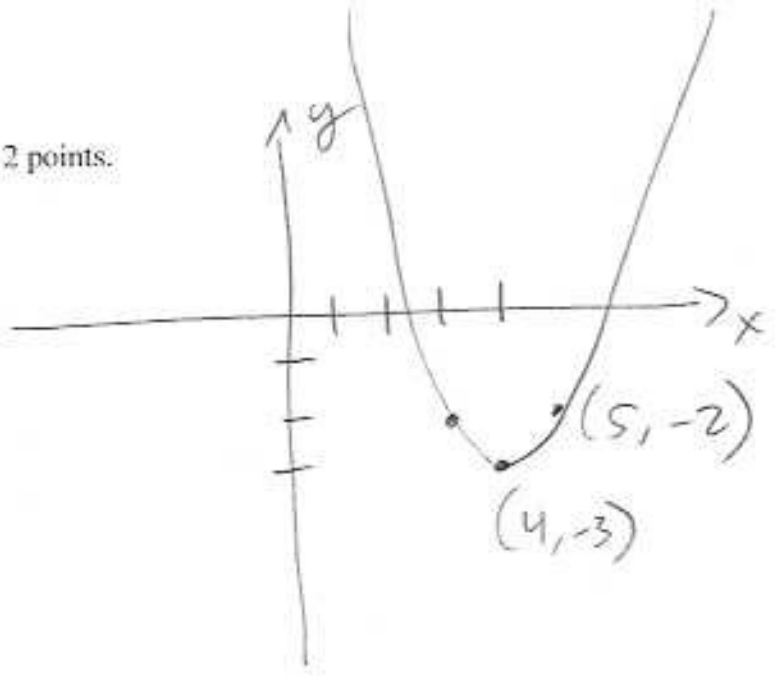
3) Calculate:

a) $7 * 0$ 0

b) $11 \div 0$ undefined

c) $\frac{0}{9}$ 0

4) Graph $y = (x - 4)^2 - 3$.
Label ordered pairs for at least 2 points.



5) Solve: (8 pts)

$x^3 - x^2 - 16x - 20 = 0$

Guesses: $\pm 1, \pm 2, \pm 3, \pm 4, \pm 5$

2 | 1 -1 -16 -20
2 2 -28
1 1 -14

-2 | 1 -1 -16 -20
-2 6 20
1 -3 -10 0

$(x+2)(x^2 - 3x - 10) = 0$

$(x+2)(x-5)(x+2) = 0$

$x = -2, 5$

or

5 | 1 -1 -16 -20
5 20 20
1 4 4 0

6a) Suppose $g(x) = 4x + 13$.
Find all x so that $g(x) = 20$. (8 pts)

$20 = 4x + 13$

$7 = 4x$

$x = \frac{7}{4}$

6b) Suppose $h(x) = 2x^2 - 8x - 11$.
Find all x so that $h(x) = -1$.

$-1 = 2x^2 - 8x - 11$

$+1 \qquad +1$

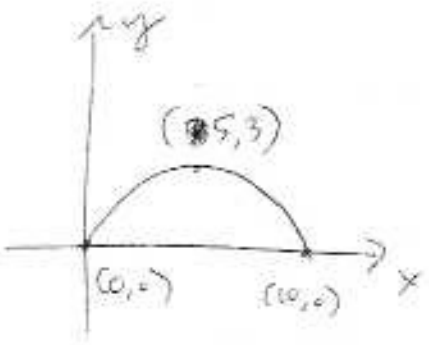
$0 = 2x^2 - 8x - 10$

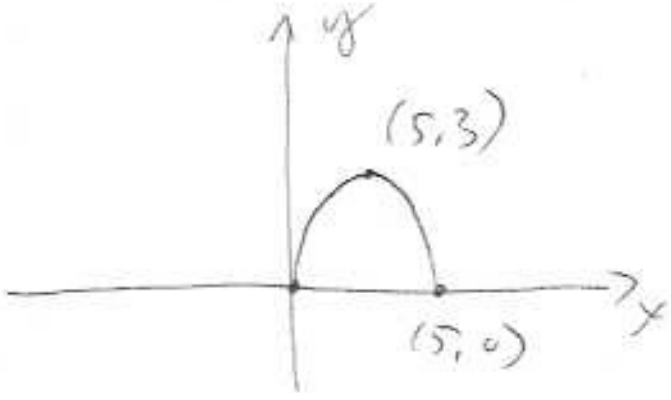
$0 = x^2 - 4x - 5$

$0 = (x-5)(x+1)$

$x = 5, -1$

7) See picture. The given graph is $y = f(x)$. On a separate coordinate system, graph $y = f(2x)$.





8) Find the domain of:

a) $f(x) = \sqrt[3]{x-10}$ All x

b) $g(x) = \frac{x+8}{(x+2)^2}$ $x \neq -2$ (8 pts)

9) Suppose $f(x) = 3x^2 - 5x - 10$

a) Find $f(4)$ $3(16) - 5(4) - 10$

$48 - 20 - 10$

18

b) Find $f(4 + h)$

$3(4+h)^2 - 5(4+h) - 10$

$3(16 + 8h + h^2) - 20 - 5h - 10$

$48 + 24h + 3h^2 - 20 - 5h - 10$

$3h^2 + 19h + 18$

10a) Write using inequality notation:

The value of x is between 10 and 15.

$10 < x < 15$

10b) Write the same math sentence using interval notation:

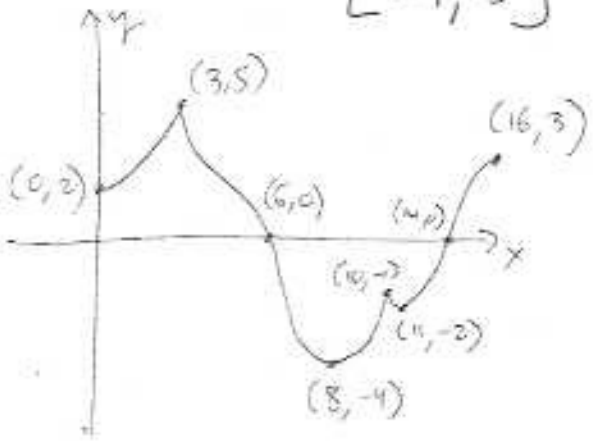
$(10, 15)$

11) See picture

a) List all intervals where the function is positive. $(0,6)$ and $(14,16)$

b) List all intervals where the function is decreasing. $(3,8)$ and $(10,11)$

c) What is the range? $[-4, 5]$



12) Write as a composition of simpler functions:

$h(x) = \sqrt{x^2 - 16}$

$h(x) = f(g(x))$

$f(x) = \sqrt{x}$

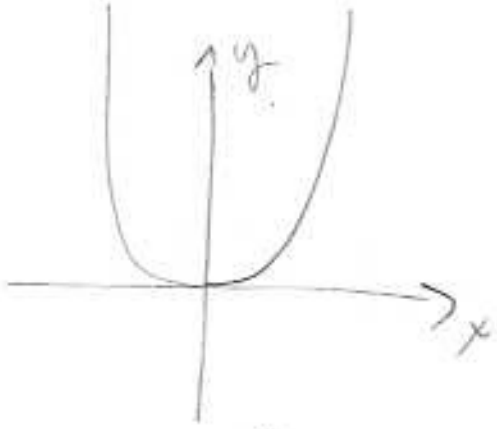
$g(x) = x^2 - 16$

13) Convert to a mixed number: $\frac{157}{3}$

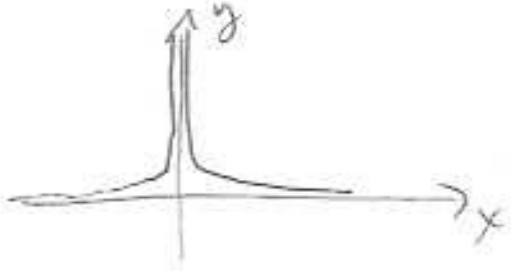
$$3\overline{)157}\quad 52$$
$$15$$
$$7$$
$$6$$
$$1$$

$52\frac{1}{3}$

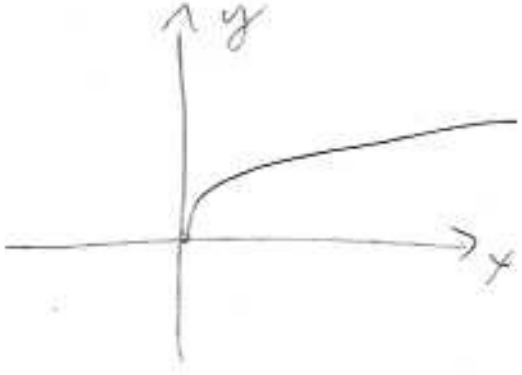
14)a) Graph $y = x^4$



b) Graph $y = x^{-4}$



c) Graph $y = x^{1/4}$

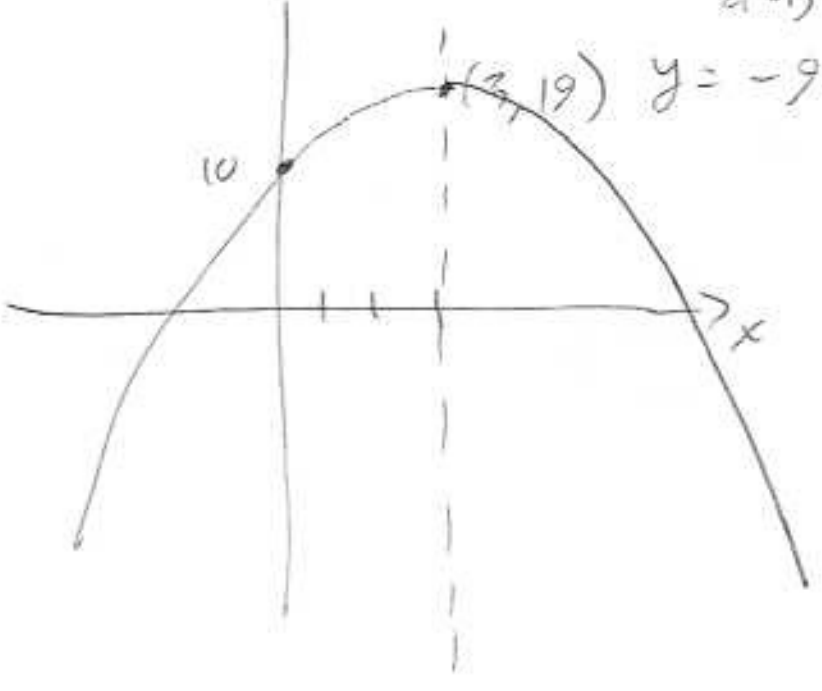


15) Graph: (8 pts)

$y = -(x^2) + 6x + 10$

Hint: Find the vertex and axis of symmetry.

$x = -\frac{6}{2(-1)} = 3$



$y = -9 + 18 + 10 = 19$

opens down