

- ① Simplify and write with positive exponents only:

$$\left(\frac{m^{-3/4}}{n^{-2/3}} \right)^{12}$$

- ② Write as a single quotient.

Simplify your answer.

$$\frac{1+x}{2x^{1/2}} + x^{1/2}$$

- ③ Factor and simplify, leaving no negative exponents.

$$(x^2+9)^{5/3} + x \cdot \frac{5}{3} (x^2+9)^{2/3} \cdot 2x$$

- ④ Find the midpoint of the segment from $(2, 9)$ to $(-4, 6)$.

- ⑤ Find the intercepts of and sketch $4x^2 + y^2 = 16$.

- ⑥ Test for symmetry and sketch $y = 3 - x^2$. Include table of values.

- ⑦ Sketch $2x - 3y = 6$.

- ⑧ Find the equation of the line through $(2, -3)$ with slope = 4, in $y = mx + b$ form.

- ⑨ The value V of a piece of art is increasing linearly. It's now worth \$2,000 and 2 years from now it will be worth \$2,600. Find an
(next column)

equation that expresses the value V in terms of t , the number of years from now.

- ⑩ Find an equation of the line through $(-3, 2)$ and perpendicular to $x - 4y = 2$.

- ⑪ Find the center and radius of

$$x^2 + y^2 - 4x + 2y - 11 = 0$$

- ⑫ Find the domain of

$$y = g(x) = \frac{1}{\sqrt{12-x}}$$

- ⑬ If $h(x) = 3x^2 - 2x$, Find and simplify $h(x-1)$.

- ⑭ Let $f(x) = \sqrt{x-3}$, $g(x) = \sqrt{5-x}$. Find $(f+g)(x)$ and its domain.

MAC 1105 EXAM II KEY (SU'09)

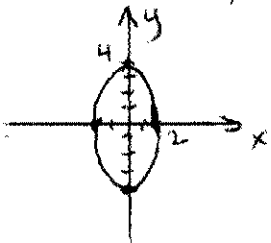
① $\frac{m^{-9}}{n^{-8}} = \frac{n^8}{m^9}$

② $\frac{1+x}{2x^{1/2}} + \frac{x^{1/2}}{1} = \frac{1+x+2x}{2x^{1/2}}$
 $= \frac{1+3x}{2x^{1/2}}$

③ $(x^2+9)^{2/3} \left[(x^2+9) + \frac{10}{3}x^2 \right]$
 $= (x^2+9)^{2/3} \left(\frac{13}{3}x^2 + 9 \right)$

④ $\left(\frac{2-4}{2}, \frac{9+6}{2} \right) = \left(-1, \frac{15}{2} \right)$

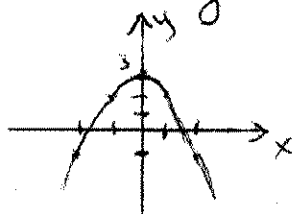
⑤ $x=0 \Rightarrow y^2=16 \Rightarrow y=\pm 4$
 $y=0 \Rightarrow 4x^2=16, x^2=4, x=\pm 2$



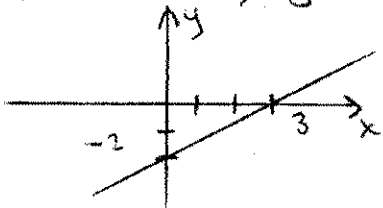
⑥ $y = 3 - (-x)^2 = 3 - x^2$

Symm. about y axis

x	y
0	3
±1	2
±2	-1
±3	-6



⑦ Intercepts: $x=3, y=-2$



⑧ $y+3 = 4(x-2)$
 $y+3 = 4x-8$
 $y = 4x-11$

⑨ $(t, V) (0, 2000) (2, 2600)$
 $m = \frac{2600-2000}{2-0} = 300$

$V = 300t + 2000$

(using $y = mx + b$)

⑩ $x - 4y = 2$

$|x-2 = 4y \Rightarrow y = \frac{1}{4}x - \frac{1}{2}$

$m_1 = -4$

$y-2 = -4(x+3)$ OR $y = -4x-1$

⑪ $x^2 - 4x + y^2 + 2y = 11$

$x^2 - 4x + 4 + y^2 + 2y + 1 = 11 + 4 + 1$

$(x-2)^2 + (y+1)^2 = 16$

center = $(2, -1)$ $r = 4$

⑫ $12-x > 0 \Rightarrow 12 > x$

So $x < 12$

⑬ $h(x) = 3x^2 - 2x$

$h(x-1) = 3(x-1)^2 - 2(x-1)$

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

$= 3x^2 - 8x + 5$

OR $(3x-5)(x-1)$

⑭ $(f+g)(x) = f(x) + g(x)$

$= \sqrt{x-3} + \sqrt{5-x}$

This does not simplify.

Domain: $x-3 \geq 0$ and $5-x \geq 0$

$x \geq 3$ and $5 \geq x$

$x \geq 3$ and $x \leq 5$

So $3 \leq x \leq 5$