

East Los Angeles College
Department of Mathematics

Math 125

Test 3

Solutions

Show all work for credit.

43 ✓

Solve the following equations for x.

1. $x^2 = 16$

$$x = \pm \sqrt{16}$$

$$x = \pm 4$$

$$\{4, -4\}$$

✓ ✓

2. $x^2 = -16$

$$x = \pm \sqrt{-16}$$

$$x = \pm 4i$$

$$\{4i, -4i\}$$

✓ ✓

3. $3x^2 = 24$
 $\frac{3}{3} \quad \frac{3}{3}$

$$x^2 = 8$$

$$x = \pm \sqrt{8}$$

$$x = \pm 2\sqrt{2}$$

$$\{2\sqrt{2}, -2\sqrt{2}\}$$

✓ ✓

4. $9x^2 - 4 = 32$

$$+4 \quad +4$$

$$\frac{9x^2}{9} = \frac{36}{9}$$

$$x^2 = 4$$

$$x = \pm \sqrt{4}$$

$$x = \pm 2$$

$$\{2, -2\}$$

✓ ✓

8 ✓

$$5. (x-3)^2 = 25$$

$$x-3 = \pm \sqrt{25}$$

$$x-3 = \pm 5$$

$$x-3 = 5 \quad ; \quad x-3 = -5$$

$$+3 \quad +3 \quad \quad +3 \quad +3$$

$$x=8 \quad ; \quad x=-2$$

$$\boxed{\{8, -2\}} \quad \checkmark \quad \checkmark$$

$$6. (x+4)^2 = 20$$

$$x+4 = \pm \sqrt{20}$$

$$x+4 = \pm \sqrt{4 \cdot 5}$$

$$x+4 = \pm 2\sqrt{5}$$

$$x+4 = \pm 2\sqrt{5}$$

$$-4 \quad -4$$

$$x = -4 \pm 2\sqrt{5}$$

$$\boxed{\{-4+2\sqrt{5}, -4-2\sqrt{5}\}} \quad \checkmark \quad \checkmark$$

$$7. x^2 - 4x + 7 = 0$$

$$a=1 \quad ; \quad b=-4 \quad ; \quad c=7$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

$$x = \frac{4 \pm \sqrt{16-28}}{2}$$

$$x = \frac{4 \pm \sqrt{-12}}{2} \quad ; \quad x = \frac{4 \pm 2\sqrt{3}i}{2}$$

$$x = \frac{4}{2} \pm \frac{2\sqrt{3}i}{2}$$

$$\boxed{x = 2 \pm \sqrt{3}i} \quad \checkmark \quad \checkmark$$

$$8. 2x^2 - x + 5 = 0$$

$$a=2 \quad ; \quad b=-1 \quad ; \quad c=5$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \cdot 2 \cdot 5}}{2 \cdot 2}$$

$$x = \frac{-1 \pm \sqrt{39}i}{4}$$

$$\boxed{x = -\frac{1}{4} \pm \frac{\sqrt{39}}{4}i} \quad \checkmark \quad \checkmark$$

$$x = \frac{1 \pm \sqrt{1-40}}{4}$$

$$x = \frac{1 \pm \sqrt{-39}}{4}$$

$$y = x^2 - 6x + 3 \quad ; \quad (1) \quad \frac{b}{2} = -\frac{-6}{2} = \boxed{-3}$$

9. Complete the square to write in graphing form.

$$(2) \quad (-3)^2 = \boxed{9}$$

Determine:

10. Vertex

$$\boxed{(3, -6)} \quad \checkmark$$

$$\begin{aligned} y &= x^2 - 6x + 9 - 9 + 3 \\ \boxed{y &= (x - 3)^2 - 6} \end{aligned} \quad \checkmark \quad \checkmark$$

11. Axis of symmetry

$$\boxed{x = 3} \quad \checkmark$$

12. Opens up/down

$$\boxed{\text{up}} \quad \checkmark$$

13. x-intercepts, if any.

$$(x - 3)^2 - 6 = 0$$

$$(x - 3)^2 = 6$$

$$x - 3 = \pm \sqrt{6}$$

$$+3 \quad +3$$

$$x = 3 \pm \sqrt{6} ;$$

$$x = 3 + \sqrt{6} \quad ; \quad x = 3 - \sqrt{6}$$

$$x = 3 + 2.4$$

$$x = 3 - 2.4$$

$$\boxed{x = 5.4} \quad ; \quad \boxed{x = 0.6} \quad \checkmark \quad \checkmark$$

14. y-intercepts.

$$y = (0 - 3)^2 - 6$$

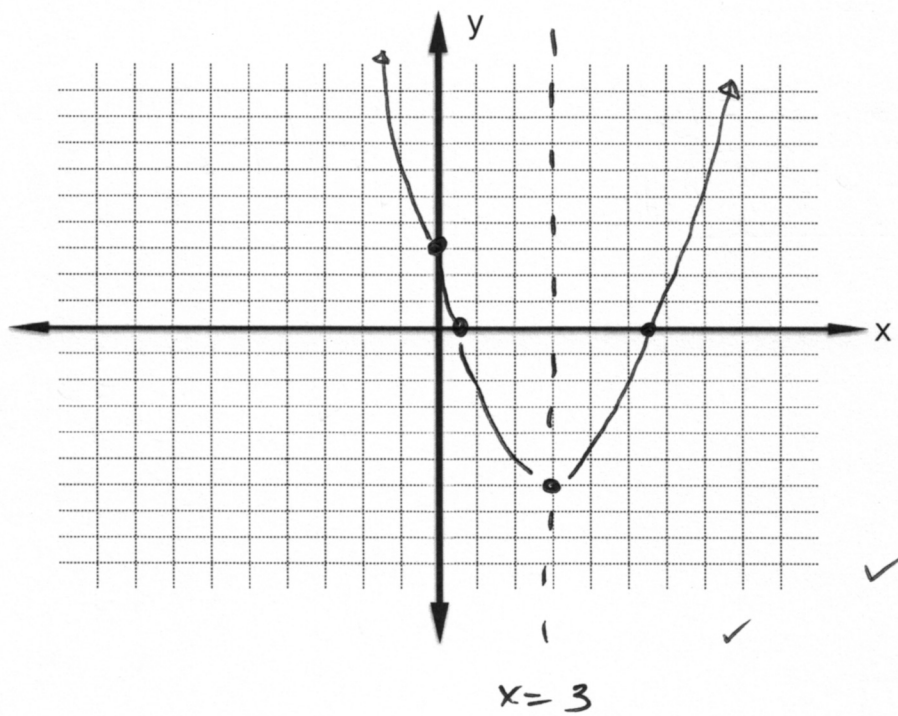
$$y = (-3)^2 - 6$$

$$y = 9 - 6 ;$$

$$\boxed{y = 3} \quad \checkmark$$

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15. Sketch the curve.



$$y = -3x^2 + 12x + 6$$

16. Complete the square to write in graphing form.

Determine:

17. Vertex

$$(2, 18) \quad \checkmark \checkmark$$

18. Axis of symmetry

$$x = 2 \quad \checkmark$$

19. Opens up/down

Down

20. x-intercepts, if any.

$$-3(x-2)^2 + 18 = 0$$

$$\frac{-3(x-2)^2}{-3} = \frac{-18}{-3}$$

$$(x-2)^2 = 6$$

$$x-2 = \pm \sqrt{6}$$

$$x = 2 \pm \sqrt{6}$$

$$x = 2 + \sqrt{6} \quad ; \quad x = 2 - \sqrt{6}$$

$$x = 2 + 2.5 \quad ; \quad x = 2 - 2.5$$

$$|x = 4.5| \quad ; \quad |x = -0.5| \quad \checkmark \checkmark$$

21. y-intercepts.

$$y = -3(0-2)^2 + 18$$

$$y = -3(-2)^2 + 18$$

$$y = -3 \cdot 4 + 18$$

$$y = -12 + 18$$

$$\frac{y}{-3} = \frac{-3x^2 + 12x + 6}{-3}$$

$$\frac{y}{-3} = \frac{-3x^2}{-3} + \frac{12x}{-3} + \frac{6}{-3}$$

$$\frac{y}{-3} = x^2 - 4x - 2$$

$$\textcircled{1} -\frac{4}{2} = (-2) \quad \textcircled{2} (-2)^2 = 4$$

$$\frac{y}{-3} = x^2 - 4x + 4 - 4 - 2$$

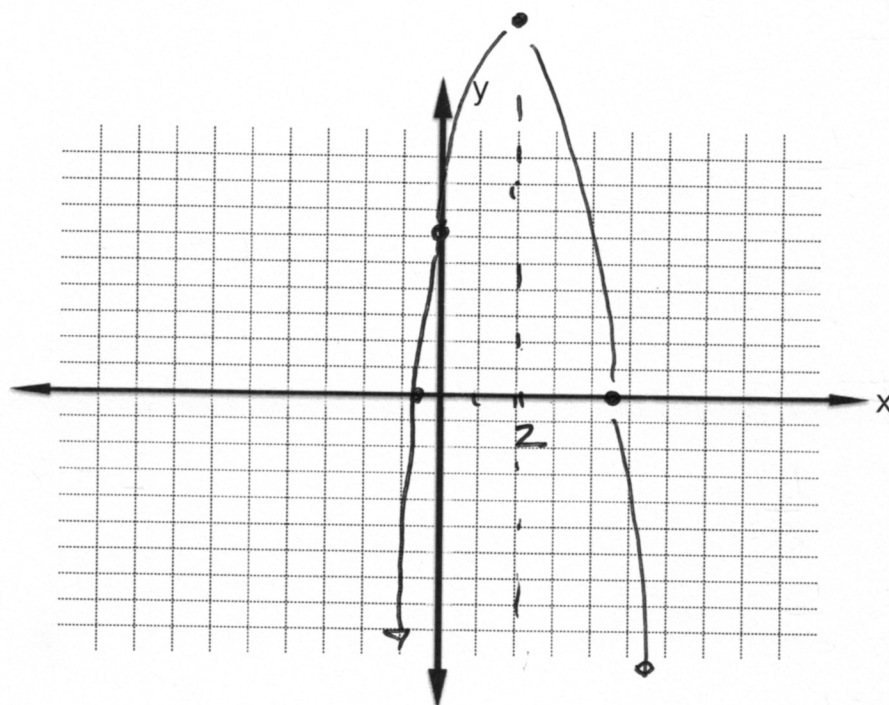
$$\frac{y}{-3} = (x-2)^2 - 6$$

$$|y = -3(x-2)^2 + 18|$$

$$; |y = 6| \quad \checkmark$$

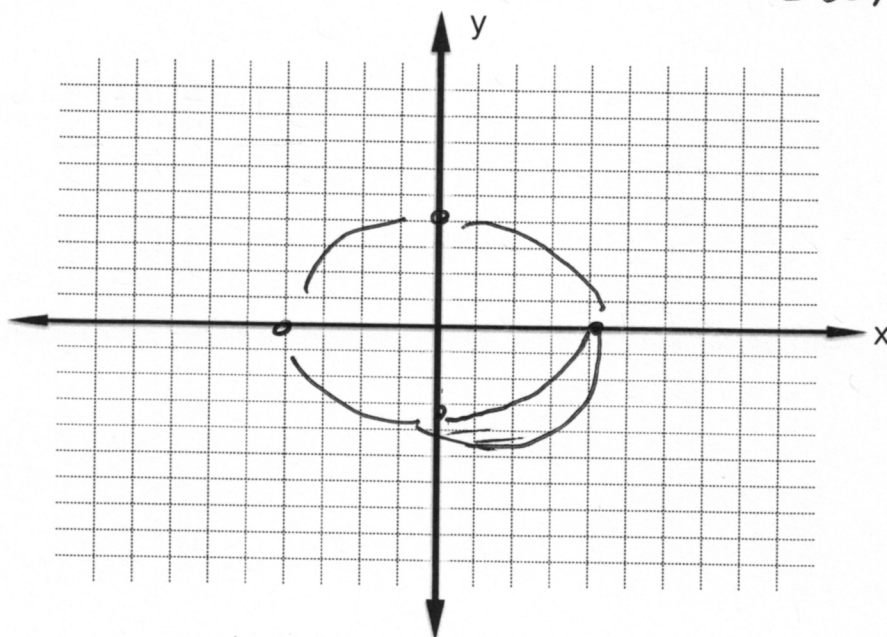
9✓

22. Sketch the curve.



✓ ✓

23) $x^2 + y^2 = 16$; $r^2 = 16$; $r = \sqrt{16}$; $(r=4)$ ✓
 $(0,0)$



circle

✓

4 ✓

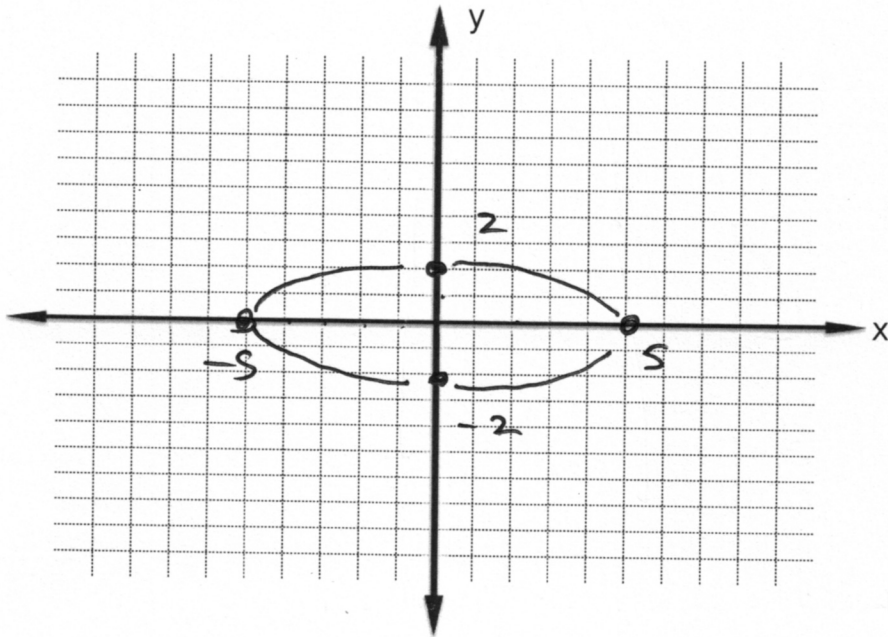
$$24) \frac{x^2}{25} + \frac{y^2}{4} = 1$$

$$a^2 = 25$$

$$a = \pm 5$$

$$b^2 = 4$$

$$b = \pm 2$$



✓ ✓

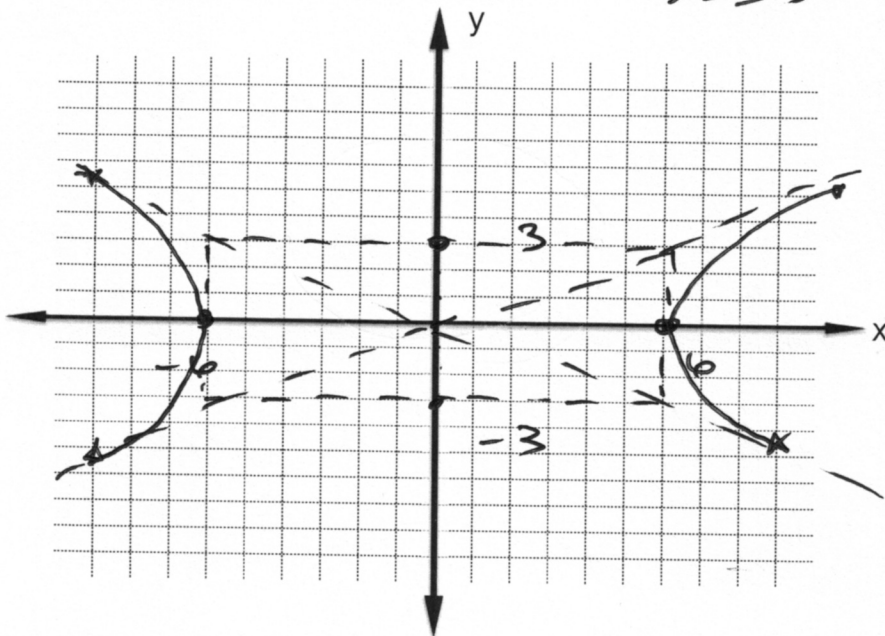
$$25) \frac{x^2}{36} - \frac{y^2}{9} = 1$$

$$a^2 = 36$$

$$a = \pm 6$$

$$b^2 = 9$$

$$b = \pm 3$$



✓ ✓

4 ✓