

$$1. \quad 9x^2 - 4y^2 - 18x + 16y - 43 = 0$$

$$9x^2 - 18x - 4y^2 + 16y - 43 = 0$$

$$9(x^2 - 2x + 1) - 4(y^2 - 4y + 4) = 43 + 9 - 16$$

$$9(x-1)^2 - 4(y-2)^2 = 36$$

$$\frac{(x-1)^2}{4} - \frac{(y-2)^2}{9} = 1$$

A

$$2. \quad \text{center } (3, 1)$$

6 on the x

$$36 - 25 = c^2$$

5 on the y

$$11 = c^2$$

$$\sqrt{11} = c$$

$$\frac{(x-3)^2}{36} + \frac{(y-1)^2}{25} = 1$$

$$\text{foci } (3 + \sqrt{11}, 1) \quad (3 - \sqrt{11}, 1)$$

D

$$3. \quad a=4 \quad b=2 \quad \text{center } (0, 0)$$

$$\frac{x^2}{16} + \frac{y^2}{4} = 1$$

A

$$4. \quad a=4 \quad (\text{y-axis})$$

$$y = \frac{2}{3}x \quad b=6$$

$$\frac{y^2}{16} - \frac{x^2}{36} = 1$$

C

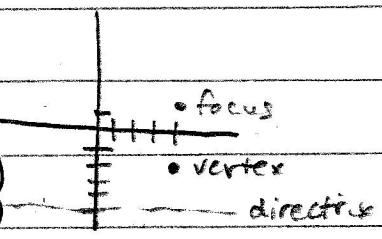
$$5. \quad \text{up/down so } u^2 \text{ is first}$$

$$\frac{u^2}{9} - \frac{x^2}{4} = 1$$

D

6. $(x-4)^2 = 12(y+2)$

Vertex (4, -2) focus (4, 1)
 $p=3$ directrix $y=-5$



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

$(2)(0) = 0$ so parabola A

8.

$$7000 = 3500 \left[1 + \frac{.07}{4} \right]^{4(t)}$$

$$\ln 2 = \ln \left[1.0175 \right]^{4t}$$

$$\ln 2 = 4t (\ln 1.0175)$$

$$39.95 = 4t$$

$9.99 = t \approx 10$ D

9. $\ln x^{1/3}$

$\frac{1}{3}$ B

10. $\log_4 x + \log_4 (x-15) = 2$

$$\log_4 x(x-15) = \log_4 4^2$$

$$x(x-15) = 16$$

$$x^2 - 15x - 16 = 0$$

$$(x-16)(x+1) = 0$$

$x=16$ ~~$x=-1$~~ B

11. $\log_3(x+4) = \log_3 3^4 + \log_3(x-4)$

$$x+4 = 3^4(x-4)$$

$$x+4 = 81x - 324$$

$$-80x = -328$$

$$80x = 328$$

$x = 4 \frac{1}{10}$ or $4 \frac{41}{10}$ A

$$12. \log_6 6^{-1/2} = -\frac{1}{2} \quad \text{A}$$

$$13. A = 300e^{(-.0077)(130)}$$

$$A = 300e^{-1.001}$$

$$A = 110 \text{ pounds} \quad \text{C}$$

$$14. e^{5x-9} = 1133$$

$$e^{5x-9} = 1137$$

$$5x-9 = \ln 1137$$

$$\frac{5x}{5} = \frac{16.03}{5} \quad \text{X} = 3.21 \quad \text{A}$$

$$15. \log \left[\frac{7x^3 \sqrt{1-x}}{2(x+1)^2} \right] = \log 7x^3(1-x)^{1/2} - \log 2(x+1)^2$$

$$= \log 7 + 3\log x + \frac{1}{2}\log(1-x) - (\log 2 + 2\log(x+1))$$

$$B \quad = \log 7 + 3\log x + \frac{1}{2}\log(1-x) - \log 2 - 2\log(x+1)$$

$$16. \ln 4^{x+4} = 5^{2x+5}$$

$$x+4(\ln 4) = 2x+5(\ln 5)$$

$$x \ln 4 + 4 \ln 4 = 2x \ln 5 + 5 \ln 5$$

$$-4 \ln 4 - 2x \ln 5$$

$$x \ln 4 - 2x \ln 5 = 5 \ln 5 - 4 \ln 4$$

$$x(\ln 4 - 2 \ln 5) = 5 \ln 5 - 4 \ln 4$$

$$\ln 4 - 2 \ln 5 \quad \ln 4 - 2 \ln 5$$

$$x = \frac{5 \ln 5 - 4 \ln 4}{\ln 4 - 2 \ln 5} \quad \text{A}$$

$$17. \frac{1}{4} [3 \ln(x+2) - \ln x - \ln(x^2-2)]$$

$$\frac{1}{4} [3 \ln(x+2) - (\ln x + \ln(x^2-2))]$$

$$\frac{1}{4} [\ln(x+2)^3 - \ln x(x^2-2)]$$

$$\frac{1}{4} \ln \frac{(x+2)^3}{x(x^2-2)}$$

$$\ln \sqrt[4]{\frac{(x+2)^3}{x(x^2-2)}} \quad \text{A}$$

$$18. 25^{x+3} = 125^{x-10}$$

$$5^{2(x+3)} = 5^{3(x-10)}$$

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

$$2x+6 = 3x-30$$

$$-2x+30 - 2x+30$$

$$36 = x \quad \text{C}$$

$$19. [x^2 + y^2 = 9] - 9$$

$$9x^2 + 25y^2 = 225$$

$$-9x^2 - 9y^2 = -81$$

$$-16y^2 = 144$$

$$y^2 = 9$$

$$y = \pm 3$$

$$\{(0, -3), (0, 3)\} \quad D$$

$$x^2 + (-3)^2 = 9$$

$$x^2 + (3)^2 = 9$$

$$x^2 + 9 = 9$$

$$x^2 + 9 = 9$$

$$x^2 = 0$$

$$x = 0$$

$$20. \frac{x+2}{x^3 - 2x^2 + x} = \frac{x+2}{x(x^2 - 2x + 1)} = \frac{x+2}{x(x-1)(x-1)}$$

$$\left[\frac{x+2}{x(x-1)(x-1)} = \frac{A}{x} + \frac{B}{x-1} + \frac{C}{(x-1)^2} \right]$$

$$x+2 = A(x^2 - 2x + 1) + B(x(x-1)) + C(x)$$

$$x+2 = Ax^2 - 2Ax + A + Bx^2 - Bx + Cx$$

$$A + B = 0$$

$$2 + B = 0$$

$$-2(2) + 2 + C = 1$$

$$-2A - B + C = 1$$

$$B = -2$$

$$-4 + 2 + C = 1$$

$$A = 2$$

$$-2 + C = 1$$

$$\frac{2}{x} + \frac{-2}{x-1} + \frac{3}{(x-1)^2} \quad A$$

$$C = 3$$

$$21. xy = 1 \quad x = \frac{1}{y}$$

$$-28x - y = 11$$

$$-28\left(\frac{1}{y}\right) - y = 11$$

$$\left[\frac{-28}{y} - y = 11 \right] y$$

$$-28 - y^2 = 11y$$

$$y^2 + 11y + 28 = 0$$

$$(y+7)(y+4) = 0$$

$$y = -7 \quad y = -4$$

$$\left(-\frac{1}{7}, -7 \right) \left(-\frac{1}{4}, -4 \right) \quad B$$