PRINTABLE VERSION

Quiz 3

You scored 100 out of 100

Question 1

Your answer is CORRECT.

Identify any holes of the following function.

$$f(x) = \frac{2x^2 - 4x}{4x^2 - 16} = \frac{2x(x-2)}{4(x^2-4)} = \frac{2x(x-2)}{4(x-2)(x+2)}$$

new $f(x) = \frac{2x}{4(x+2)}$ ↓ at $x = 2$

new $f(2) = \frac{2(2)}{4(2+2)} = \frac{4}{4(4)} = \frac{4}{16} = \frac{1}{4}$

$(2, 1/4)$

a) $(-2, 0)$

b) *none*

c) $\left(2, \frac{1}{4}\right)$

d) $\left(-2, \frac{1}{4}\right)$

e) $(2, 0)$

Question 2

Your answer is CORRECT.

bottom = 0 after cancel like terms

Give the vertical asymptote(s) for the graph of

$$f(x) = \frac{x^2 + 16x + 63}{x^2 - x - 2} = \frac{(x+7)(x+9)}{(x-2)(x+1)}$$

$x - 2 = 0$, $x = 2$

$x + 1 = 0$, $x = -1$

a) $x = 7,\ x = -2$

b) $x = 1,\ x = -2$

c) $x = -1,\ x = 2$

d) $x = -9,\ x = 1$

e) $x = -1,\ x = 2,\ x = -7$

f) None of the above.

Question 3

Your answer is CORRECT.

y=0 (top =0 after you factor)

Give the coordinates of the x-intercept(s) for the graph of

$$f(x) = \frac{x^2 - 17x + 70}{x^2 - x - 42} = \frac{(x-7)(x-10)}{(x-7)(x+6)}$$

$$= \frac{x-10}{x+6}$$

a) (7, 0), (10, 0)

b) (-6, 0)

c) (10, 0)

$x - 10 = 0$

$x = 10$

d) (7, 0), (-6, 0)

e) (10, 0), (-6, 0)

f) None of the above.

Question 4

Your answer is CORRECT.

Give the vertical asymptote(s) for the graph of

$$f(x) = \frac{x^2 - 17x + 70}{x^2 - x - 42} = \frac{(x-7)(x-10)}{(x-7)(x+6)}$$

$$= \frac{x-10}{x+6}$$

a) $x = -7,\ x = 6$

b) $x = 6$

c) $x = -6$

V.A. $x = -6$

d) $x = -6,\ x = 7$

e) $x = 10,\ x = -6$

f) None of the above.

Question 5

Your answer is CORRECT.

Give the horizontal asymptote(s) for the graph of

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

leading term: x^2

$10x^3$ ← bigger

a) $y = 2,\ y = 3$

$y = 0$

b) $y = 1$

c) $y = 1/10$

d) There are no horizontal asymptotes

e) $y = 0$

f) None of the above.

Question 6

Your answer is CORRECT.

Give the domain for the graph of

$$f(x) = \frac{x^2 - 9}{x^2 + 8x + 15} = \frac{(x-3)(x+3)}{(x+3)(x+5)}$$

bottom $\neq 0$

$x + 3 \neq 0$ $\quad x + 5 \neq 0$

$x \neq -3$ $\quad x \neq -5$

a) All real numbers except $x = 3$ and $x = -5$.

b) All real numbers except $x = -3$ and $x = -5$.

c) All real numbers except $x = -3$.

d) All real numbers except $x = -5$.

e) All real numbers.

f) None of the above.

Question 7

Your answer is CORRECT.

Give the horizontal asymptote(s) for the graph of

$$f(x) = \frac{6\,(x+8)\,(-3-x)}{(x-2)\,(x+4)}$$

leading: $-6x^2$

leading: $1x^2$

a) $y = 2$

b) $y = 0$

$y = \frac{-6}{1}$

c) There are no horizontal asymptotes.

d) $y = 6$

$y = -6$

e) $y = -6$

f) None of the above.

Question 8

Your answer is CORRECT.

Identify the location of any holes (i.e. removable discontinuities) in the graph of

$$f(x) = \frac{-x^2 - 4x + 32}{x^2 + 11x + 24} = \frac{-(x^2+4x-32)}{x^2+11x+24}$$

a) (-8, -12/5)

$$= \frac{-(x+8)(x-4)}{(x+3)(x+8)} = \frac{-(x-4)}{(x+3)}$$

b) (-8, -12/5) and (4, 0)

c) (8, -4/11)

d) (-4, -8)

$x+8=0$

$x=-8$

$f(-8) = \frac{-(-8-4)}{-8+3} = \frac{12}{-5}$

e) (4, 0)

$(-8, \frac{-12}{5})$

f) None of the above.

Question 9

Your answer is CORRECT.

Identify the y-intercept, if there is one.

$x=0$

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

$(0,3)$

a) There is no y-intercept.

$f(0) = \frac{0-3}{0-1} = \frac{-3}{-1} = 3$

b) (0, 3)

c) (0, -1)

d) (0, -3)

e) (0, 1)

f) None of the above.

Question 10

Your answer is CORRECT.

Does the function have a horizontal asymptote, a slant (oblique) asymptote, or neither?

$$f(x) = \frac{-x^3 + 3x^2 + 5}{2x^6 - 2x - 7}$$

bottom bigger

$y = 0$

a) Neither

b) Slant

c) Horizontal

Question 11

Your answer is CORRECT.

The graph of the function

HA: $y = 5$

$$f(x) = \frac{5x^2 + 9x + 6}{x^2 + x - 2}$$

has a horizontal asymptote. If the graph crosses this asymptote, give the x-coordinate of the intersection. Otherwise, state that the graph does not cross the asymptote.

a) $x = -\frac{13}{4}$

b) $x = -\frac{15}{4}$

c) $x = -\frac{7}{2}$

$\frac{5x^2+9x+6}{x^2+x-2} = \frac{5}{1}$

$5(x^2+x-2) = 5x^2+9x+6$

$5x^2+5x-10 = 5x^2+9x+6$

$-16 = 4x$

$x = -4$

d) *The graph does not cross the asymptote.*

e) $x = -4$

f) *None of the above.*

Question 12

Your answer is CORRECT.

Find the point of intersection of $f(x)$ and the horizontal asymptote.

$$f(x) = \frac{x^2+6x+2}{2x^2+7x+2}$$

HA: $y = \frac{1}{2}$

$\frac{x^2+6x+2}{2x^2+7x+2} = \frac{1}{2}$

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

$2x^2+7x+2 = 2x^2+12x+4$

$-2 = 5x$

$x = -2/5$

a) (-2/5, 1/10)

b) (1/5, 27/29)

c) (-2/5, 7/10)

d) (-2/5, 1/2)

e) (2/5, 57/64)

f) *None of the above.*

Question 13

Your answer is CORRECT.

What is the situation with respect to holes and vertical asymptotes for

$$f(x) = \frac{5}{x^2-3x-4} = \frac{5}{(x+1)(x-4)}$$

V.A. $x = -1$

$x = 4$

a) Two holes and no vertical asymptotes.

b) Neither holes nor vertical asymptotes.

c) Two vertical asymptotes and no holes.

d) One hole and one vertical asymptote.

e) One hole and no vertical asymptotes.

f) None of the above.

Question 14

Your answer is CORRECT.

Identify the slant (oblique) asymptote for the graph of

$$f(x) = \frac{-7x^2 - 5x + 4}{x - 1}$$

top one bigger by 1 degree

Quotient (slant)

$$\begin{array}{r} -7x - 12 \\ x-1 \;\overline{)\; -7x^2 - 5x + 4} \\ -(-7x^2 + 7x) \\ \hline -12x + 4 \\ -(-12x + 12) \\ \hline -8 \end{array}$$

$y = -7x - 12$

a) $y = -4$

b) $y = -7x - 5$

c) $y = -7$

d) $y = -7x + 2$

e) $y = -7x - 12$

f) None of the above.

Question 15

Your answer is CORRECT.

Which of these is a rational function?

poly / poly → whole # powers

Function I:

$$f(x) = \frac{\sqrt{x-9}}{x^5 + 6x^3 - 8x + 9}$$

not polynomial

Function II:

$$f(x) = \frac{\sqrt{29}\,x^5 + 6x^3 - 8}{x^5 + 6x^3 - 8x + 9}$$

YES

Function III:

$$f(x) = \frac{|x+9|}{x^5 + 6x^3 - 8x + 9}$$

Function IV:

$$f(x) = x^{3/5} + x^{1/3} - 6$$

fractions as powers not polynomials

a) III only

b) II and IV only

c) II only

d) IV only

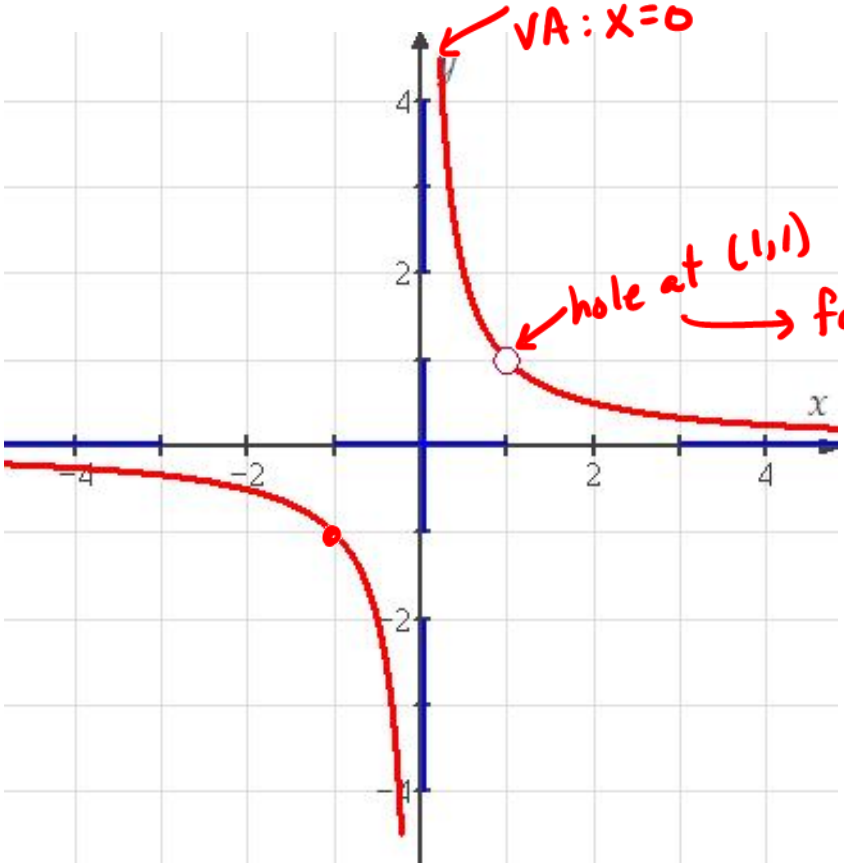
e) I only

f) None of the above.

Question 16

Your answer is CORRECT.

Which of the following expressions will generate the following graph?



a) $f(x) = -\dfrac{x+1}{x(x+1)}$

b) $f(x) = -\dfrac{x-1}{x(x-1)} = \dfrac{-1}{x}$

c) $f(x) = \dfrac{x-1}{x(x-1)} = \dfrac{1}{x}$

d) $f(x) = \dfrac{x+1}{x\,(x+1)}$

e) $f(x) = \dfrac{1}{x}$

f) None of the above.

$(y-k)^2 = 4p(x-h)$

From: Homework #3

9. Solve the system of equations: (Hint: Sketch first)

Hyperbola Vertical

$$\frac{(y+3)^2}{4} - \frac{(x-2)^2}{25} = 1$$

Parabola Horizontal

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

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

$4p = \frac{-1}{10}$

$\frac{-1}{10}(x-2) = (y+3)^2$

$p = \frac{-1}{40}$

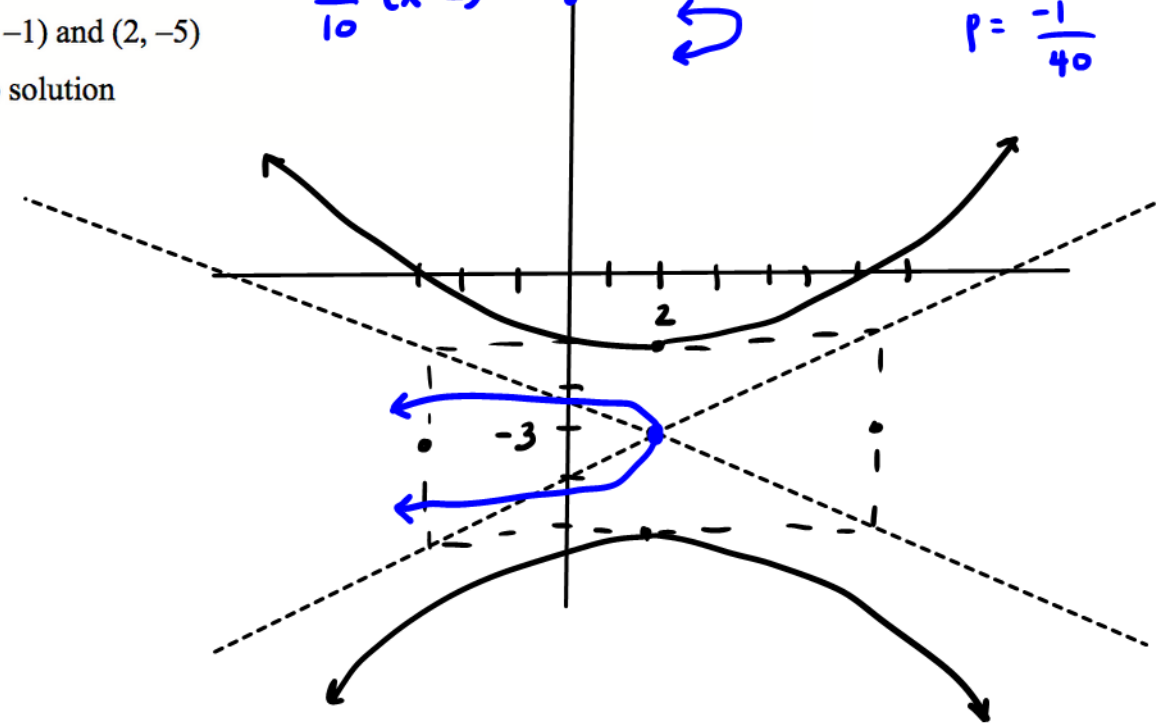
A. (–3, 2)

B. (2, –3)

C. (7, –3) and (–3, –3)

D. (2, –1) and (2, –5)

E. No solution



Find the quadratic function satisfying the following conditions:

- the axis of symmetry is $x = 6$
- the y intercept is $(0, 36)$
- there is only one x-intercept.

a) $f(x) = 6x^2 + x + 36$

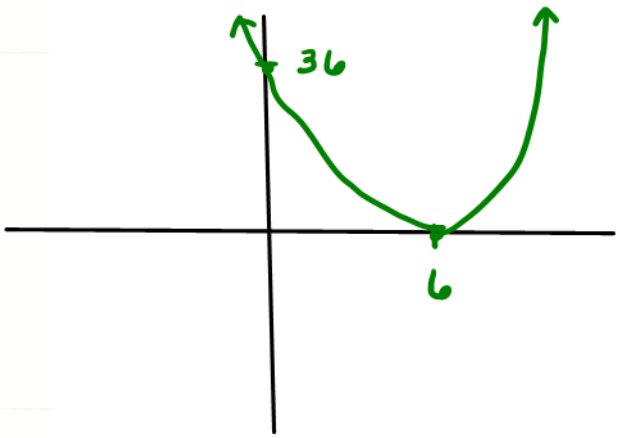
b) $f(x) = -x^2 + 12x + 36$

c) $f(x) = x^2 - 12x + 36$

d) $f(x) = -6x^2 + 36$

e) $f(x) = x^2 + 6x + 36$

f) None of the above.



Given the function

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

$$f(x) = x^2 - 12x + 36$$

Given the function

$$f(x) = x^2 - 6x + 4$$

Which of the following statements is true?

a) $f(x)$ has a maximum value. The value is 7.

b) $f(x)$ has a minimum value. The value is -13.

c) $f(x)$ has a minimum value. The value is 1.

d) $f(x)$ has a minimum value. The value is -5.

e) $f(x)$ has a maximum value. The value is -5.

d) None of the above

$$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right) = (3, f(3))$$

$$\frac{6}{2} = 3$$

$$f(3) = 3^2 - 6(3) + 4$$

$$= 9 - 18 + 4$$

$$= -5 \text{ (min value)}$$

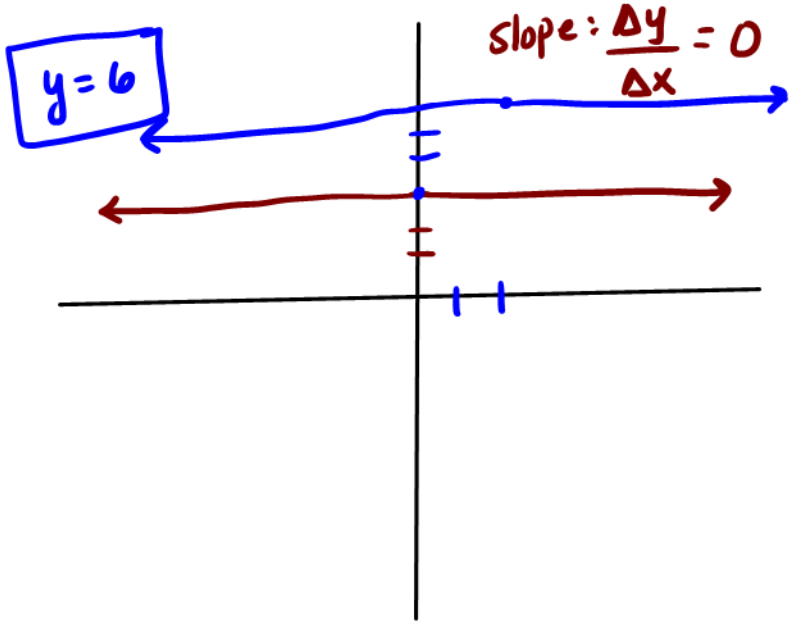
Find the linear function f that satisfies the given conditions:

passes through (2, 6) and parallel to the line $y = 3$

(2,6) // $y=3$

↑

slope of 0



Question 18

Your answer is INCORRECT.

State the coordinates of the foci for the given ellipse.

From Quiz #4

$$\frac{x^2}{(36)} + \frac{y^2}{(49)} = 1$$

a) $(\sqrt{85}, 0) \cdot (-\sqrt{85}, 0)$

b) $(0, -\sqrt{13}) \cdot (0, \sqrt{13})$

c) $(\sqrt{85}, -\sqrt{13}) \cdot (-\sqrt{85}, \sqrt{13})$

d) $(-\sqrt{13}, 0) \cdot (\sqrt{13}, 0)$

e) $(0, -\sqrt{85}) \cdot (0, \sqrt{85})$

f) None of the above.

↑ bigger

Vertical

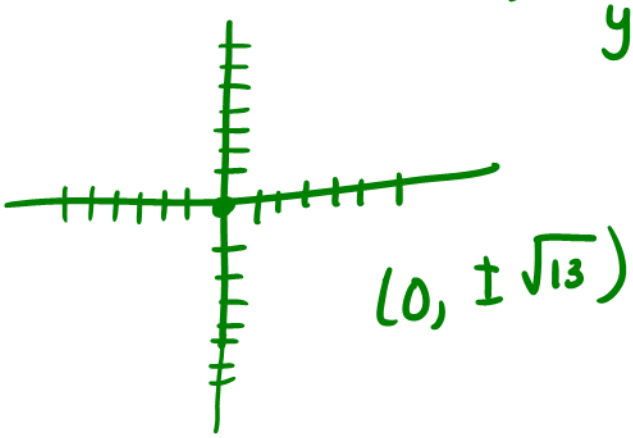
$c^2 = a^2 - b^2$

$c^2 = 49 - 36$

$c^2 = 13$

$c = \pm\sqrt{13}$

(0,0) add c to the y



$(0, \pm\sqrt{13})$

Question 20

Your answer is INCORRECT.

Write the following in standard form for an ellipse.

From Quiz #4

$4x^2 - 24x - 39 + 25y^2 - 50y = 0$

a) $\frac{(x+3)^2}{(25)} + \frac{(y+1)^2}{(4)} = 1$

b) $\frac{(x-3)^2}{(4)} + \frac{(y-1)^2}{(25)} = 1$

c) $\frac{(x-3)^2}{(25)} + \frac{(y-1)^2}{(4)} = 1$

d) $\frac{(x-3)^2}{(10)} + \frac{(y-1)^2}{(10)} = 1$

e) $\frac{(x+3)^2}{(4)} + \frac{(y+1)^2}{(25)} = 1$

f) None of the above.

39
36
25

$4x^2 - 24x + 25y^2 - 50y = 39$

$4(x^2 - 6x + \frac{(-6/2)^2}{}) + 25(y^2 - 2y + \frac{(\frac{-2}{2})^2}{}) = 39 + 4(-3^2) + 25(1^2)$

$4(x-3)^2 + 25(y-1)^2 = 39 + 4(9) + 25$

$\frac{4(x-3)^2}{100} + \frac{25(y-1)^2}{100} = \frac{100}{100}$

$\frac{(x-3)^2}{25} + \frac{(y-1)^2}{4} = 1$