Make Up
Test 1

Question 1

The graph of the function

$$f(x) = \frac{x-3}{x^2+7x+12}$$

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

a) $x = 4$

b) $x = 0$

c) $x = 3$

d) $x = 6$

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

f) ***None of the above.***

Question 2

Simplify

$$1 - \cos^2 x + (\sin^2 x)\ (\cot^2 x)$$

a) $\csc(x)$

b) $\cos x$

c) -1

d) 1

e) $\sin(x)\cos(x)$

f) ***None of the above.***

Question 3

Find the coordinates of the *x*-intercept(s) for

$$f(x) = \frac{x^2 + 3x - 18}{x^2 - 8x + 15}$$

a) **(0,5) and (0,-6)**

b) **(-3,0) and (-6,0)**

c) **(3,0)**

d) **(-6,0)**

e) **(0,3) and (0,-6)**

f) ***None of the above.***

Question 4

Find the linear function f with both (-7 , -6) and (-4 , -2) on the graph of f^{-1}.

a) $f(x) = \frac{3}{2}x + 2$

b) $f(x) = \frac{5}{4}x + \frac{1}{2}$

c) $f(x) = \frac{3}{4}x - \frac{5}{2}$

d) $f(x) = \frac{1}{2}x - 4$

e) $f(x) = x - 1$

f) ***None of the above.***

Question 5

Given

$$[h(x) = x^4 - 2, g(x) = x^3 - 1, f(x) = x^2 - 4]$$

Find

$$f(g(1) + h(1))$$

a) -2

b) -65

c) -3

d) -4

e) 5

f) ***None of the above.***

Question 6

Find all roots of the polynomial:

$$p(x) = -4x^3 - 28x^2 + 36x + 252$$

a) $\{x = -7, x = -3\}$

b) $\{x = -7, x = -4, x = -3\}$

c) $\{x = 0, x = 3, x = 7\}$

d) $\{x = -7, x = 3\}$

e) $\{x = -7, x = -3, x = 3\}$

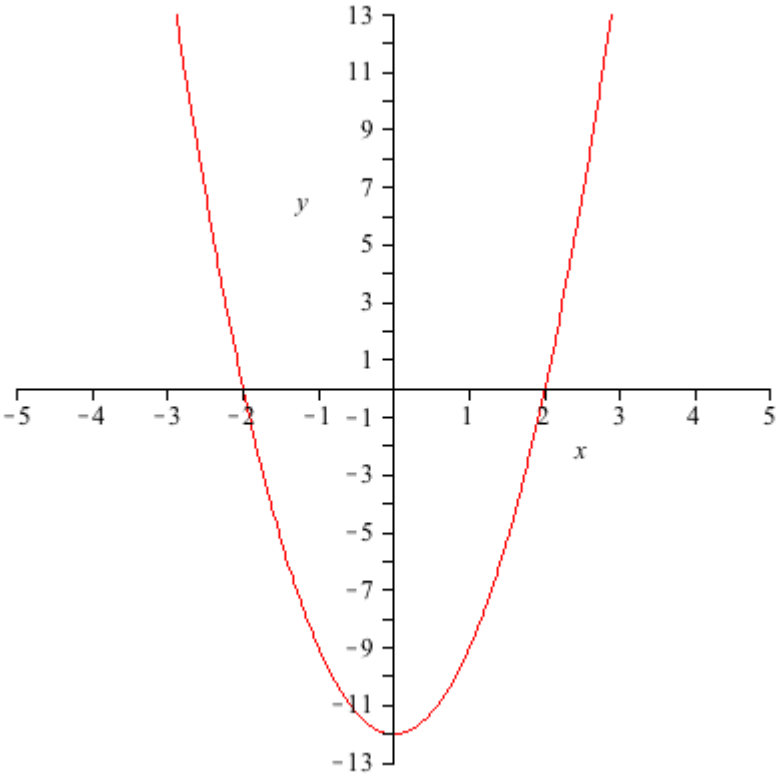
f) ***None of the above.***

Question 7

Which of the following graphs represents the given function?

$$f(x) = -3x^2 + 12$$

a)



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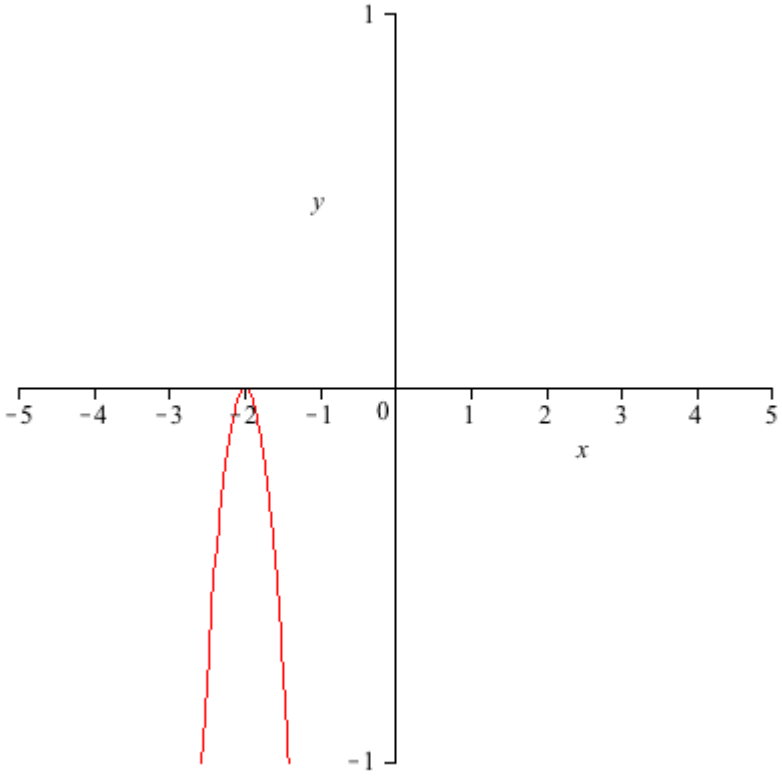

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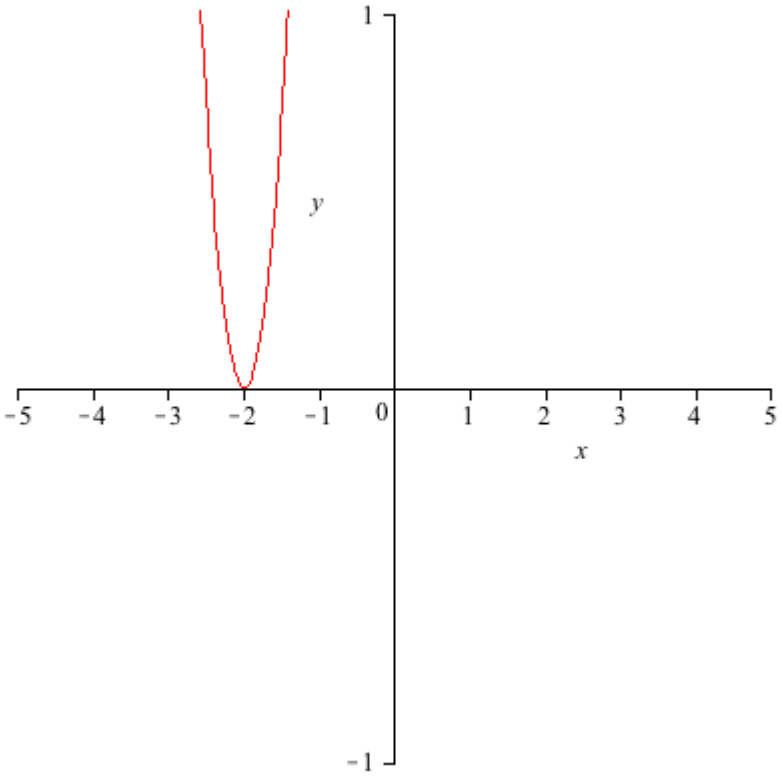

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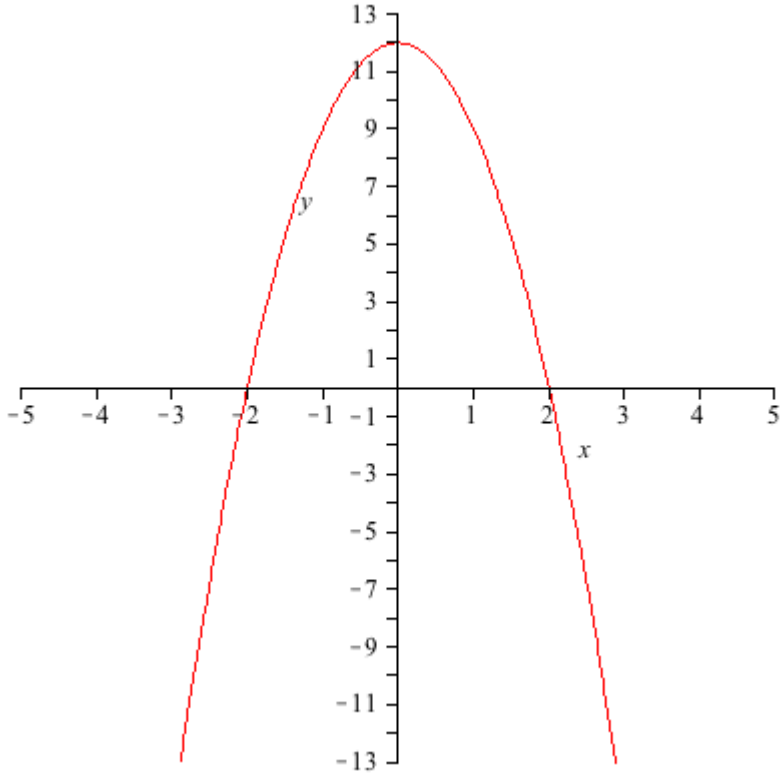
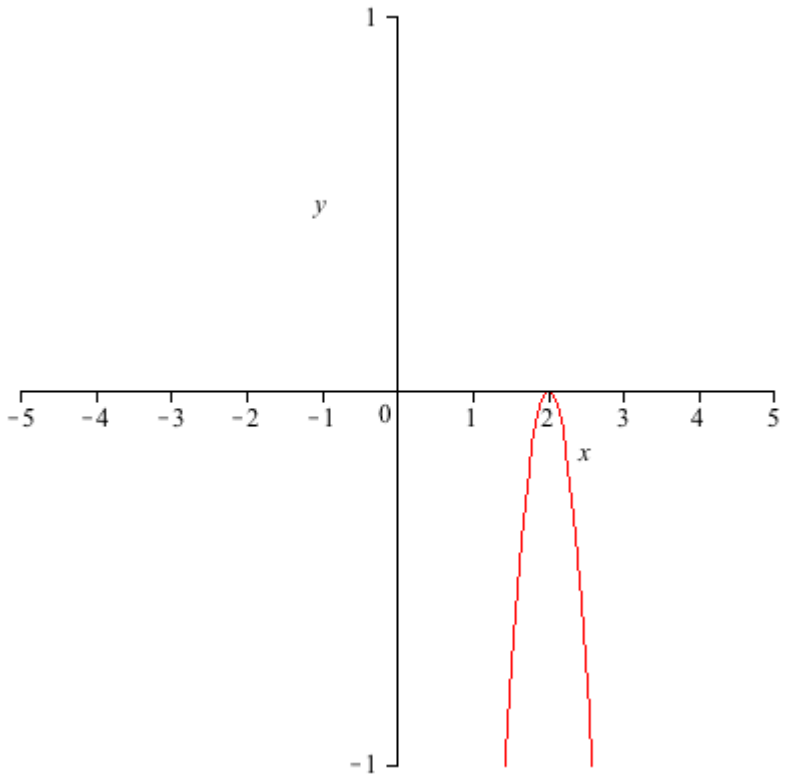


e)



f) ***None of the above.***

Question 8

Perform the indicated operation and reduce completely.

$$\frac{x}{x^2-4}-\frac{x}{x^2+2x-8}-\frac{5}{x^2+6x+8}$$

In reduced form, the numerator is:

a) $5x+2$

b) $11x-10$

c) $-3x^4-2x^3+52x^2+8x-160$

d) $-3x+10$

e) $x^2 + 5x + x^3 - 10$

f) ***None of the above.***

Question 9

Simplify the following.

$$\frac{\left(\frac{x^2 - 4x + 4}{x^{11}\, y^{13}}\right)}{\left(\frac{x-2}{x\, y^7}\right)}$$

a) $\frac{x^{10}\, y^{20}}{x+2}$

b) $\frac{y^6\, x^{10}}{x-2}$

c) $\frac{x-2}{y^6\, x^{10}}$

d) $\frac{x-2}{x^{12}\, y^6}$

e) $\frac{x+2}{x^{10}\, y^{20}}$

f) ***None of the above.***

Question 10

Given

$$f(x) = (x+4)^2 - 1$$

Simplify

$$\frac{f(x+h)-f(x)}{h}, h \neq 0$$

when $x = 2$.

a) $-12+h$

b) $35+h$

c) $\frac{h^2+8h-20}{h}$

d) $12+h$

e) $(h+4)^2-1$

f) ***None of the above.***

Question 11

Given

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

$$g(x) = x^2 + x - 30$$

Find the domain of $\frac{f}{g}$.

a) **$(-\infty, -6) \cup (5, \infty)$**

b) **$(-\infty, -5) \cup (-5, 6) \cup (6, \infty)$**

c) **$(-\infty, -6) \cup (-6, 5) \cup (5, \infty)$**

d) **$(-\infty, 2/3) \cup (2/3, \infty)$**

e) **$(-\infty, -6] \cup [5, \infty)$**

f) ***None of the above.***

Question 12

The line perpendicular to the line which contains the points (5, -4) and (3, 2) has slope

a) **-3**

b) **3**

c) **$-\frac{1}{4}$**

d) **$\frac{1}{3}$**

e) **$-\frac{1}{3}$**

f) ***None of the above.***

Question 13

Find the *x*-coordinates of the points of intersection for the following functions below:

$$f(x) = x^2 + 8x + 14$$

$$g(x) = -x^2 - 8x - 8$$

a) $\left\{4 + \sqrt{5}, \frac{1}{2}\sqrt{5} - 2\right\}$

b) $\{-4 - \sqrt{5}, \sqrt{5} - 4\}$

c) $\{-8 - 2\sqrt{5}, -8 + 2\sqrt{5}\}$

d) $\{-10-\sqrt{5}, \sqrt{5}-10\}$

e) $\{4+\sqrt{5}, -\sqrt{5}+4\}$

f) ***None of the above.***

Question 14

Suppose that triangle ABC has $m\angle C = 90^o$, AC = 4 and AB = 12. Find cot(A) and csc(B).

a) $\left[\cot(A)=4\sqrt{10}, \csc(B)=\frac{1}{16}\sqrt{2}\right]$

b) $\left[\cot(A)=\frac{3}{4}\sqrt{2}, \csc(B)=\frac{1}{3}\right]$

c) $[\cot(A)=3, \csc(B)=2\sqrt{2}]$

d) $\left[\cot(A)=\frac{1}{4}\sqrt{2}, \csc(B)=3\right]$

e) $[\cot(A)=8\sqrt{2}, \csc(B)=48\sqrt{10}]$

f) ***None of the above.***

Question 15

Given $\cot(\theta) = -\frac{1}{3}$ and $\frac{\pi}{2} < \theta < \pi$, find $\sin(\theta)$.

a) $-\frac{3}{13}\sqrt{13}$

b) $\frac{3}{10}\sqrt{10}$

c) $\frac{3}{13}\sqrt{13}$

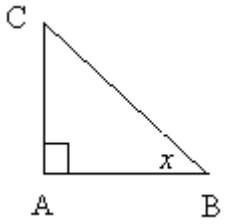
d) $-\frac{3}{10}\sqrt{10}$

e) $\frac{1}{3}\sqrt{10}$

f) ***None of the above.***

Question 16

Determine the angle *x* in the triangle given below with AB = 11 and AC = 5.



a) $x = \arccos\left(\frac{5}{146}\sqrt{146}\right)$

b) $x = \arcsin\left(\frac{11}{146}\sqrt{146}\right)$

c) $x = \arctan\left(\frac{11}{146}\sqrt{146}\right)$

d) $x = \arctan\left(\frac{5}{11}\right)$

e) $x = \arcsin\left(\frac{11}{5}\right)$

f) ***None of the above.***

Question 17

Put the equation in standard form for an ellipse.

$$4x^2 - 16x + 16y^2 + 32y = 32$$

a) $\frac{1}{4}(x-2)^2+\frac{1}{16}(y+1)^2=1$

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

c) $\frac{1}{16}(x+1)^2+\frac{1}{4}(y-2)^2=1$

d) $\frac{1}{16}(x-2)^2+\frac{1}{4}(y+1)^2=1$

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

f) ***None of the above.***

Question 18

Find the coordinates of the vertex for the following parabola.

$$3x^2-3x+4-y=0$$

a) $\left(\frac{1}{2},0\right)$

b) $\left(\frac{1}{2},\frac{13}{4}\right)$

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

d) $(0,4)$

e) $(-3,40)$

f) ***None of the above.***

Question 19

Solve for θ given

$$2\cos\theta + 1 = 0$$

and

$$\mathbf{0 \leq \theta \leq \pi}$$

a) $\frac{2}{3}\pi$

b) *no solution on the given interval*

c) $\frac{1}{3}\pi$

d) $\frac{5}{6}\pi$

e) $\frac{4}{3}\pi$

f) ***None of the above.***

Question 20

Find *f*(1) given

$$f(x) = \begin{cases} -2x - 4 & x \leq -3 \\ 1 & -3 < x \text{ and } x < 0 \\ -3x^2 - 2 & 0 \leq x \end{cases}$$

a) **6**

b) **-10**

c) **1**

d) **-6**

e) **-5**

f) ***None of the above.***

Question 21

Simplify

$$\left(\frac{1}{x}-1\right)\left(-4-\frac{4}{x^2}\right)$$

a) $-\frac{4}{x}+\frac{4}{x^3}-4+\frac{4}{x^2}$

b) $-\frac{4}{x}+\frac{4}{x^3}+4-\frac{4}{x^2}$

c) $-4x+\frac{4}{x}+4-\frac{4}{x^2}$

d) $-4x-\frac{4}{x}+4+\frac{4}{x^2}$

e) $-\frac{4}{x^2}+8-4x^2$

f) ***None of the above.***

Question 22

A circle contains the four vertices of a square with side of length 13. The area of the region outside the square and inside the circle is

a) $169\sqrt{2}\,\pi - 169$

b) $\frac{169}{2}\pi - 169$

c) $\frac{169}{2} - \frac{169}{4}\pi$

d) $169\,\pi - \frac{169}{2}$

e) $\frac{169}{4}\pi - \frac{169}{2}$

f) ***None of the above.***

Question 23

If $x = 3$, find the smallest value of y which satisfies

$$y^2 x + 3\,y\,x^2 + 24 = 0$$

a) 1

b) -8

c) 2

d) -1

e) 8

f) ***None of the above.***

Question 24

The inequality $(x+3)\,(x+2) > 0$ is equivalent to

a) $\{3 < x \text{ or } x < 2\}$

b) $\{x < -3 \text{ or } -2 < x\}$

c) $-3 < x$

d) $x < -2$

e) $\{-3 < x \text{ and } x < -2\}$

f) ***None of the above.***

Question 25

Solve the system of equations for *x* and *y*.

$$\begin{bmatrix} -3x - 2y = 3 \\ 2x - 3y = 5 \end{bmatrix}$$

a) $\left\{x = -\frac{1}{13}, y = -\frac{21}{13}\right\}$

b) $\left\{x = \frac{1}{13}, y = -\frac{21}{13}\right\}$

c) $\left\{x = -\frac{1}{13}, y = \frac{21}{13}\right\}$

d) $\left\{x = -\frac{21}{13}, y = \frac{1}{13}\right\}$

e) *The system does not have a solution.*

f) ***None of the above.***