

# PRINTABLE VERSION

## Practice Test 1

### Question 1

Compute  $(f \circ g)(x)$ , given that  $f(x) = \frac{4x-3}{2x-1}$  and  $g(x) = \frac{1}{2x}$ .

- a)   $\frac{8x^2 - 4x - 1}{2(2x-1)x}$
- b)   $\frac{2x-1}{8x-6}$
- c)   $\frac{3x+1}{x}$
- d)   $\frac{3x-2}{x-1}$
- e)   $\frac{2(4x-3)x}{2x-1}$

### Question 2

Find the coordinates of the  $x$ -intercept(s) for  $f(x) = \frac{x^2 - x - 20}{x^2 - 8x + 15}$ .

- a)  (0,5) and (0,4)
- b)  (-3,0) and (-5,0)
- c)  (-4,0)
- d)  (4,0)
- e)  (5,0) and (-4,0)

### Question 3

The graph of the function  $f(x) = \frac{3x^2 + 12x + 12}{2x^2 - 3x + 1}$  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)   $x = -\frac{6}{11}$
- b)   $x = -\frac{7}{11}$
- c)   $x = -\frac{10}{11}$
- d)   $x = -\frac{5}{11}$
- e)  The graph does not cross the asymptote.

#### Question 4

Find  $f(8)$ ,  $f(-2)$  and  $f(-5)$  given

$$f(x) = \begin{cases} 3x^2 + 6 & x \leq -3 \\ 4 & -3 < x < 4 \\ -2x - 2 & x \geq 4 \end{cases}$$

- a)   $f(8) = 4$ ,  $f(-2) = 18$  and  $f(-5) = 81$
- b)   $f(8) = -18$ ,  $f(-2) = 4$  and  $f(-5) = 81$
- c)   $f(8) = -18$ ,  $f(-2) = 18$  and  $f(-5) = 4$
- d)   $f(8) = 4$ ,  $f(-2) = 4$  and  $f(-5) = 81$
- e)   $f(8) = 198$ ,  $f(-2) = -2$  and  $f(-5) = 4$

#### Question 5

Find the coordinates of the vertex for the following parabola.

$$y = -\frac{1}{4}x^2 + 4x + 6$$

- a)  (8, 0)
- b)  (0, 6)

- c)  (8, 6)
- d)  (4, 18)
- e)  (8, 22)

**Question 6**

Find the linear function  $f$  with  $f^{-1}(-6) = 3$  and  $f^{-1}(-2) = 4$ .

- a)   $f(x) = -\frac{1}{4}x + 3$
- b)   $f(x) = 4x + 18$
- c)   $f(x) = \frac{1}{4}x - 3$
- d)   $f(x) = \frac{1}{4}x + 18$
- e)   $f(x) = 4x - 18$

**Question 7**

Put the equation in standard form for a hyperbola.

$$16x^2 - 9y^2 + 64x + 36y = 116$$

- a)   $\frac{(x-2)^2}{9} - \frac{(y-2)^2}{16} = 1$
- b)   $\frac{(x+2)^2}{9} - \frac{(y-2)^2}{16} = 1$
- c)   $\frac{(x+2)^2}{16} + \frac{(y-2)^2}{9} = 1$
- d)   $\frac{x^2}{16} - \frac{y^2}{9} = 1$
- e)   $\frac{x^2}{9} - \frac{y^2}{16} = 1$

**Question 8**

Find the  $x$ -coordinates of the points of intersection for the functions:  $f(x) = x^2 - 6$  and  $g(x) = -x + 12$ .

- a)   $\{-1/4 + 1/4\sqrt{73}, 1/2 + 1/2\sqrt{73}\}$
- b)   $\{-1 - \sqrt{73}, -1 + \sqrt{73}\}$
- c)   $\{1/2 - 1/2\sqrt{73}, 1/2 + 1/2\sqrt{73}\}$
- d)   $\{-1/2 - 1/2\sqrt{73}, -1/2 + 1/2\sqrt{73}\}$
- e)   $\{-13/2 - 1/2\sqrt{73}, -13/2 + 1/2\sqrt{73}\}$

### Question 9

Find all roots of the polynomial  $P(x) = \frac{3}{4}x^5 - 6x^2$ .

- a)   $\{x = -2, x = -1\}$
- b)   $\{x = 0, x = 2\}$
- c)   $\{x = 0, x = 2, x = 3\}$
- d)   $\{x = -2, x = 0\}$
- e)   $\{x = 0, x = 3\}$

### Question 10

Which of the following are true statements?

- I.  $\sin^2 \theta + \cos^2 \theta = 1$
- II.  $\tan^2 \theta + 1 = \sec^2 \theta$
- III.  $1 + \cot^2 \theta = \csc^2 \theta$
- IV.  $\frac{1}{\csc^2 \theta} + \frac{1}{\sec^2 \theta} = 1$

- a)  I and III only.
- b)  II and III only.
- c)  I, II, and III only.

- d)  None of these are true.
- e)  All of these statements are true.

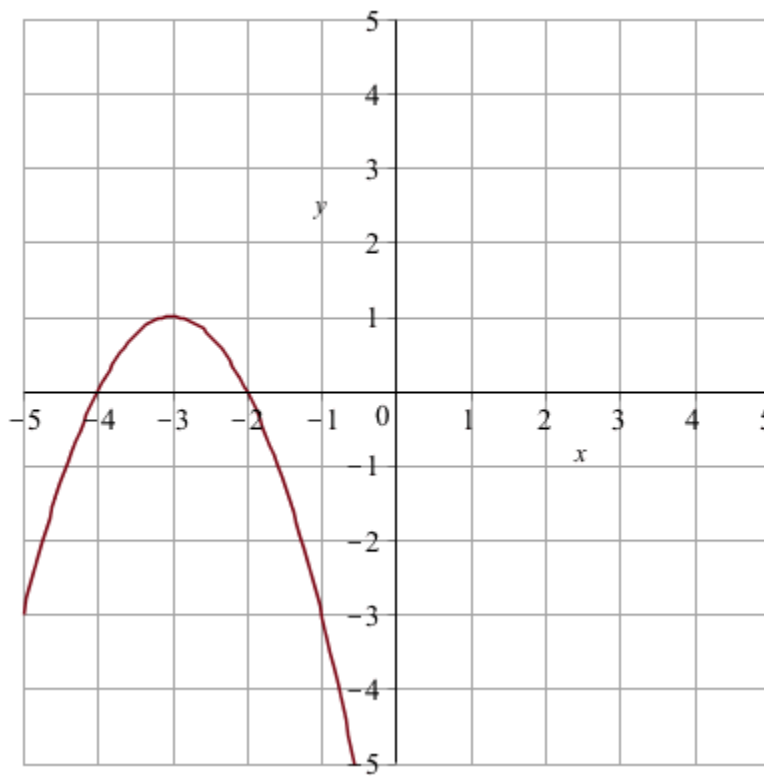
**Question 11**

Simplify the expression:  $\frac{7 \sec(A)}{\tan(A) + \cot(A)}$

- a)   $7 \csc(A)$
- b)   $7 \sin(A)$
- c)   $7 \sec(A)$
- d)   $7 \cot(A)$
- e)   $7 \cos(A)$

**Question 12**

Which of the following functions matches the graph below?



- a)   $f(x) = (x + 3)^2 - 1$
- b)   $f(x) = -(x + 3)^2 + 1$
- c)   $f(x) = -(x - 3)^2 + 1$
- d)   $f(x) = -(x + 1)^2 + 3$
- e)   $f(x) = (x - 1)^2 + 3$

**Question 13**

Given  $f(x) = \sqrt{3x - 5}$  and  $g(x) = x^2 - 4x - 12$ , find the domain of  $\frac{g}{f}$ .

- a)   $[\frac{5}{3}, 6) \cup (6, \infty)$
- b)   $[\frac{5}{3}, \infty)$
- c)   $(-\infty, \frac{5}{3}) \cup (\frac{5}{3}, \infty)$
- d)   $(-\infty, -2) \cup (6, \infty)$
- e)   $(\frac{5}{3}, \infty)$

**Question 14**

Perform the indicated operation and reduce completely.

$$\frac{x}{x^2 + 11x + 30} + \frac{3}{x^2 + 3x - 10} - \frac{x}{x^2 + 4x - 12}$$

- a)   $\frac{-20x^2 - 18x + 36}{(x + 6)(x + 5)(x - 6)(x - 2)}$
- b)   $\frac{-4x + 18}{(x + 6)(x + 5)(x - 2)}$
- c)   $\frac{x^3 + 10x^2 + 35x + 18}{(x + 6)(x + 5)(x - 2)}$

d)   $\frac{-x^3 - 12x^2 - 25x + 18}{(x+6)(x+5)(x-2)}$

e)   $\frac{-22x^2 - 18x + 108}{(x+6)(x+5)(x-6)(x-2)}$

### Question 15

Simplify the following:

$$\frac{\left(\frac{x-5}{xy^3}\right)}{\left(\frac{x^2-6x+5}{x^{11}y^{17}}\right)}$$

a)   $\frac{x+5}{x^{10}y^{20}}$

b)   $\frac{x-1}{y^{14}x^{10}}$

c)   $\frac{x-5}{y^{14}x^{12}}$

d)   $\frac{x^{10}y^{20}}{x+5}$

e)   $\frac{y^{14}x^{10}}{x-1}$

### Question 16

Simplify the following. No answer should contain negative exponents.

$$\frac{x^3y^{-2}z^2}{(3x^{-13}y^5)^{-1}}$$

a)   $\frac{3z^2}{x^{10}y^3}$

b)   $\frac{-x^{16}z^2}{3y^7}$

- c)   $\frac{-y^3 z^2}{3x^{10}}$
- d)   $\frac{3y^3 z^2}{x^{10}}$
- e)   $3x^{16}y^3z^2$

**Question 17**

Given  $f(x) = \frac{x-1}{x+3}$ , simplify  $\frac{f(x+h)-f(x)}{h}$ ,  $h \neq 0$  when  $x = -1$ .

- a)   $\frac{h-1}{h+3}$
- b)   $\frac{2}{h-2}$
- c)  0
- d)   $\frac{2}{h+2}$
- e)   $h-1$

**Question 18**

Given that  $f(x) = x^2 + 3x$  and  $g(x) = 5x - 2$ , find  $(f \circ g)(2)$ .

- a)  48
- b)  88
- c)  5
- d)  24
- e)  52

**Question 19**

Let  $f(x) = \frac{5x^2 - 3}{4x^2 + 5}$ . Find the y-intercept of  $f(\sqrt{2x+5})$ .



- a)   $(0, -\frac{3}{5})$
- b)   $(0, \frac{5}{4})$
- c)   $(0, \frac{17}{21})$
- d)   $(0, \frac{22}{25})$
- e)   $(0, \frac{122}{105})$

**Question 20**

Suppose that  $\sec(B) = -\frac{11}{8}$  and that  $180^\circ < B < 270^\circ$ . Find  $\sin(B)$ .

- a)   $\sin(B) = \frac{\sqrt{57}}{19}$
- b)   $\sin(B) = -\frac{\sqrt{57}}{11}$
- c)   $\sin(B) = -\frac{\sqrt{57}}{19}$
- d)   $\sin(B) = -\frac{\sqrt{3}}{11}$
- e)   $\sin(B) = \frac{\sqrt{57}}{11}$

**Question 21**

Suppose that  $\theta$  is an acute angle of a right triangle and that  $\sec(\theta) = \frac{8}{5}$ . Find  $\cos(\theta)$  and  $\csc(\theta)$ .

- a)   $\cos(\theta) = \frac{\sqrt{39}}{8}$  and  $\csc(\theta) = \frac{5\sqrt{39}}{39}$
- b)   $\cos(\theta) = \frac{5}{8}$  and  $\csc(\theta) = \frac{8\sqrt{39}}{39}$

- c)   $\cos(\theta) = \frac{8}{5}$  and  $\csc(\theta) = \frac{8\sqrt{39}}{39}$
- d)   $\cos(\theta) = \frac{8\sqrt{39}}{39}$  and  $\csc(\theta) = \frac{\sqrt{39}}{5}$
- e)   $\cos(\theta) = \frac{5}{8}$  and  $\csc(\theta) = \frac{\sqrt{39}}{8}$

**Question 22**

List all  $x$ -intercepts for  $y = -3 \sin\left(\frac{1}{2}x + \frac{\pi}{5}\right)$ , on the interval  $\left[-\frac{2\pi}{5}, 4\pi\right]$ .

- a)   $\left\{\frac{\pi}{5}, \frac{9\pi}{5}, \frac{18\pi}{5}\right\}$
- b)   $\left\{-\frac{2\pi}{5}, \frac{8\pi}{5}, \frac{18\pi}{5}\right\}$
- c)   $\left\{-\frac{2\pi}{5}, \frac{9\pi}{5}, \frac{19\pi}{5}\right\}$
- d)   $\left\{0, \frac{8\pi}{5}, \frac{18\pi}{5}\right\}$
- e)   $\left\{-\frac{2\pi}{5}, \frac{8\pi}{5}, \frac{4\pi}{5}\right\}$

**Question 23**

Solve  $\sec^2(x) = 1$  over the interval  $\left[-\frac{\pi}{2}, \frac{5\pi}{2}\right]$ .

- a)   $\left\{-\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}\right\}$
- b)   $\{0, \pi, 2\pi\}$
- c)   $\left\{0, \frac{5\pi}{2}\right\}$
- d)   $\left\{\frac{\pi}{2}, \frac{3\pi}{2}\right\}$

e)   $\{-\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}\}$

**Question 24**

Given  $f(x) = \frac{3x^2 - 9x}{2x^2 - 18}$ , identify any horizontal asymptotes.

a)   $y = \frac{3}{2}$

b)   $y = -3$

c)   $y = 3$

d)   $y = 0$

e)  There are none.

**Question 25**

Find the exact value of the following expression. If undefined, state, *undefined*.

$$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$$

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

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

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

d)  *undefined*

e)   $-\frac{5\pi}{6}$