

# PRINTABLE VERSION

## Practice Test 4

### Question 1

Find the  $x$ -intercepts of

$$P(x) = (x - 8)^5(x - 10)^2(x + 6)^2$$

- a)   $\{-8, 10, 6\}$
- b)   $\{8, 10, -6\}$
- c)   $\{8, -10, 6\}$
- d)   $\{-7, 11, -6\}$
- e)   $\{-8, -10, 6\}$
- f)  None of the above

### Question 2

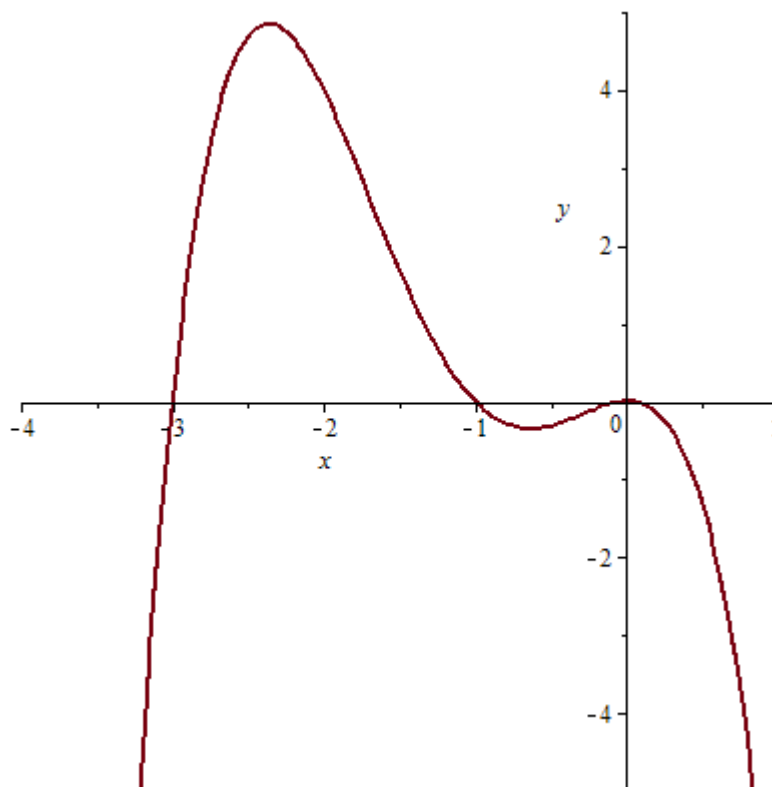
Find all  $y$ -intercept(s) of

$$Q(x) = (x - 9)^3(x - 8)^2(x + 2)^5$$

- a)   $\{-9, -8, 2\}$
- b)   $\{9^3, 8^2, 2^5\}$
- c)   $\{9, 8, -2\}$
- d)   $9^3 \cdot 8^2 \cdot 2^5$
- e)   $-9^3 \cdot 8^2 \cdot 2^5$
- f)  None of the above

### Question 3

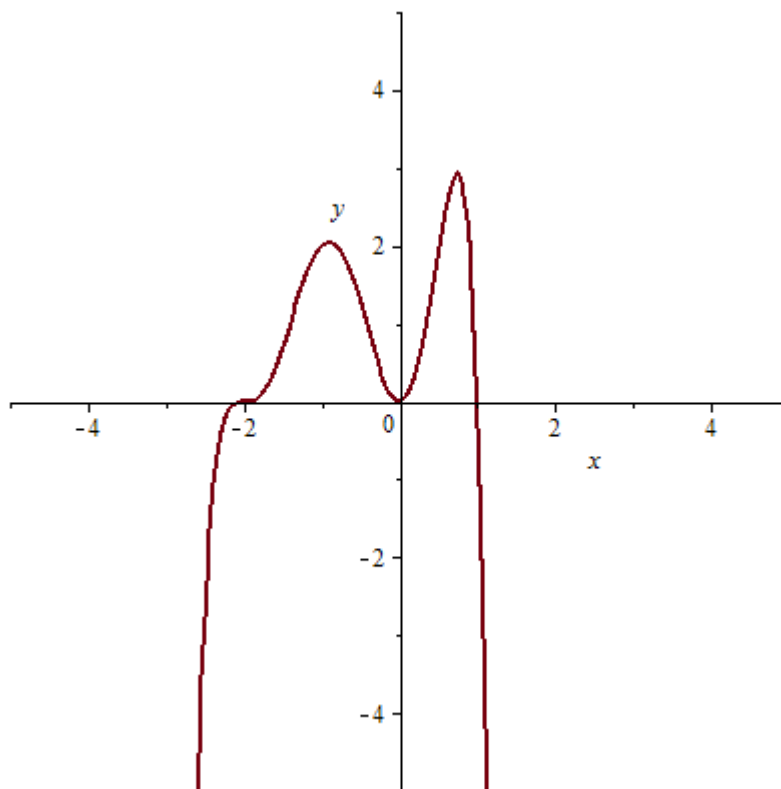
Which of the following functions could correspond to graph below?



- a)   $f(x) = -(x - 3)^2 (x + 1) x^3$
- b)   $f(x) = -(x + 3)^3 (x - 1) x$
- c)   $f(x) = -(x - 3) (x + 1)^2 x^3$
- d)   $f(x) = -(x + 3) (x + 1) x^2$
- e)   $f(x) = -(x - 3) (x + 1) x$
- f)  None of the above

#### Question 4

Which of the following functions could correspond to the graph below?



- a)   $f(x) = -(x - 1)x^2(x + 2)^3$
- b)   $f(x) = -(x + 2)x^2(x - 1)^3$
- c)   $f(x) = -x(x - 1)^2(x + 2)^3$
- d)   $f(x) = (x - 1)x^2(x + 2)^3$
- e)   $f(x) = (x - 1)(x + 2)^2x^3$
- f)  None of the above



### Question 5

Given the polynomial

$$p(x) = 6x^4 - 9x^3 + 10x + 7$$

describe the end behavior of the graph of  $p$ .

- a)  ↙ ↗
- b)  ↖ ↘
- c)  ↖ ↗

- d)  
- e)  
- f)  None of the above

**Question 6**

Given the polynomial

$$P(x) = (x - 3)^2 (x + 1) (x - 2)^3$$

, the behavior of the  $x$ -intercept  $x = 2$  resembles to the shape of

- a)  Cubic upward from left to right
- b)  Cubic downward from left to right
- c)  Parabola, downward
- d)  Increasing line
- e)  Decreasing line
- f)  None of the above

**Question 7**

Given the polynomial

$$P(x) = 2x^4 + 24x^3 + 54x^2$$

, find all  $x$ -intercepts.

- a)   $x = 3, x = 9$
- b)   $x = 0, x = 3, x = 9$
- c)   $x = 0, x = -12, x = -9$
- d)   $x = 0, x = -3, x = -9$
- e)   $x = -3, x = -9$
- f)  None of the above

**Question 8**

Use long division to find the quotient and remainder of

$$\frac{2x^3 + 7x^2 + 8x + 5}{x^2 + x + 8}$$

- a)  [Q = 2x + 5, R = -13x - 35]
- b)  [Q = 2x + 5, R = 17x - 72]
- c)  [Q = 2x + 9, R = 3x - 40]
- d)  [Q = 2x + 5, R = 3x + 40]
- e)  [Q = 2x + 5, R = 17x - 40]
- f)  None of the above

### Question 9

Use synthetic division to find the quotient and remainder of

$$\frac{-x^2 + x + 1}{x + 2}$$

- a)  [Q = -x + 3, R = -5]
- b)  [Q = -x + 3, R = -9]
- c)  [Q = -x + 5, R = -5]
- d)  [Q = -x + 3, R = -8]
- e)  [Q = -x + 2, R = -5]
- f)  None of the above

### Question 10

Use Remainder Theorem to evaluate  $P(4)$

$$P(x) = 2x^4 - 7x^3 + 6x - 14$$

- a)  69
- b)  73

- c)  72
- d)  74
- e)  80
- f)  None of the above

**Question 11**

Given  $x = -4$  is a zero of the polynomial

$$P(x) = x^3 - 2x^2 - 19x + 20$$

find the other zero of  $P(x)$ .

- a)   $x = 1, x = 5$
- b)   $x = -4, x = 5$
- c)   $x = -1, x = 4$
- d)   $x = -4, x = 1$
- e)   $x = -2, x = 3$
- f)  None of the above

**Question 12**

Find the zero(s) of the function

$$P(x) = x^3 + 2x^2 - 25x - 50$$

- a)   $\{-5, 5, -2\}$
- b)   $\{5, -2, 2\}$
- c)   $\{-5, 5, 2\}$
- d)  -2
- e)   $\{5, 2\}$
- f)  None of the above

**Question 13**

Find a polynomial with integer coefficients that satisfies the following conditions :

Degree of polynomial : 3

Zeros : 4,  $3i$

Constant coefficient :  $-72$

- a)   $P(x) = x^3 - 4x^2 - 18x - 72$
- b)   $P(x) = x^3 + 8x^2 + 18x + 72$
- c)   $P(x) = 2x^3 - 8x^2 + 18x - 72$
- d)   $P(x) = 3x^3 - 2x^2 + 18x - 72$
- e)   $P(x) = x^3 - 8x^2 + 18x - 72$
- f)  None of the above

**Question 14**

Factor the polynomial completely and find all its zeros and their multiplicities.

$$P(x) = x^5 + 12x^4 + 36x^3$$

- a)  The zeros are: 0 of multiplicity 1,  $-6$  of multiplicity 4
- b)  The zeros are: 0 of multiplicity 3,  $-6$  of multiplicity 2
- c)  The zeros are: 0 of multiplicity 4,  $6$  of multiplicity 1
- d)  The zeros are: 0 of multiplicity 2,  $6$  of multiplicity 2
- e)  The zeros are: 0 of multiplicity 4,  $-6$  of multiplicity 2
- f)  None of the above

**Question 15**

Find a polynomial of degree 5 with integer coefficients that has zeros  $1$ ,  $\sqrt{2}i$ ,  $i$ , and  $y$ -intercept of  $-4$ .

- a)   $P(x) = 2(x+1)(x^2-1)(x^2-2)$
- b)   $P(x) = (x+1)(x^2-1)(x^2-2)$

- c)   $P(x) = 2(x - 1)(x^2 - 1)(x^2 - 2)$
- d)   $P(x) = 2(x - 1)(x^2 + 1)(x^2 + 2)$
- e)   $P(x) = (x - 1)(x^2 + 1)(x^2 + 2)$
- f)  None of the above

**Question 16**

Factor the polynomial into linear irreducible factors.

$$P(x) = (x^2 + 5)(x^2 + 10)$$

- a)   $P(x) = (x - \sqrt{5}i)(x + \sqrt{5}i)(x - \sqrt{10})(x + \sqrt{10})$
- b)   $P(x) = (x - \sqrt{5})^2(x - \sqrt{10})^2$
- c)   $P(x) = (x - \sqrt{5})(x + \sqrt{5})(x - \sqrt{10}i)(x + \sqrt{10}i)$
- d)   $P(x) = (x - \sqrt{5})(x + \sqrt{5})(x - \sqrt{10})(x + \sqrt{10})$
- e)   $P(x) = (x - \sqrt{5}i)(x + \sqrt{5}i)(x - \sqrt{10}i)(x + \sqrt{10}i)$
- f)  None of the above

**Question 17**

Find the  $x$ -intercept(s) of the function

$$f(x) = \frac{x^2 - 9x + 20}{x^2 - 7x + 10}$$

- a)   $x = 4$
- b)   $x = 5, x = 2$
- c)  There are no  $x$ -intercepts.
- d)   $x = 5$
- e)   $x = 2$
- f)  None of the above

**Question 18**



Find the  $y$ -intercept(s) of the function

$$f(x) = \frac{14}{x + 11}$$

- a)  There are no  $y$ -intercept.
- b)  14
- c)   $\frac{14}{11}$
- d)   $-\frac{14}{11}$
- e)   $-14$
- f)  None of the above

### Question 19

Find the horizontal asymptote(s), if any, of the function

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

- a)   $y = 0$
- b)   $y = 1$
- c)   $y = -3$
- d)   $y = 7$
- e)  There are no horizontal asymptotes.
- f)  None of the above

### Question 20

Find the vertical asymptote(s), if any, of the function

$$f(x) = \frac{x^2 - 17x + 66}{x^2 - 9x + 18}$$

- a)   $x = 6, x = 3$

- b)  There are no vertical asymptotes.
- c)   $x = 6$
- d)   $x = 3$
- e)   $x = 11$
- f)  None of the above

**Question 21**

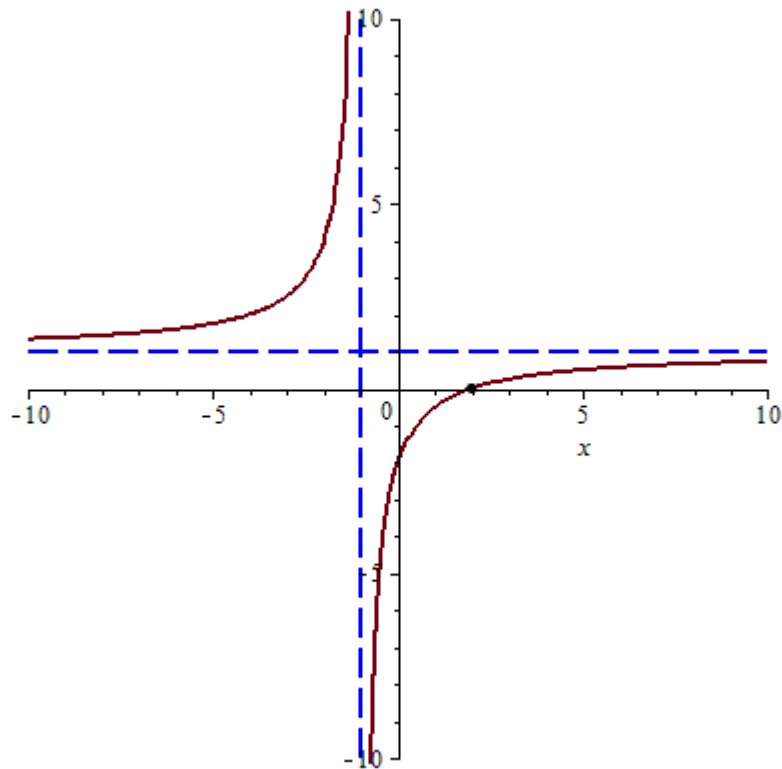
Find any holes of the function

$$f(x) = \frac{x - 4}{x^2 - x - 12}$$

- a)   $x = -9$
- b)   $x = -4$
- c)  There are no holes.
- d)   $x = 4$
- e)   $x = -3$
- f)  None of the above

**Question 22**

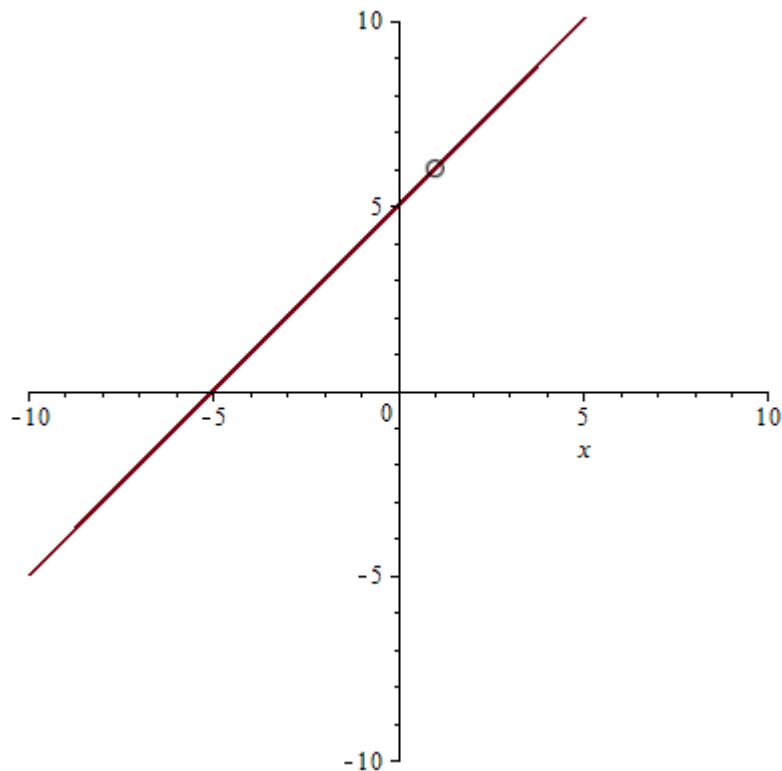
Find the function, whose graph is shown below



- a)   $f(x) = \frac{x+2}{x+1}$
- b)   $f(x) = \frac{x+1}{x-2}$
- c)   $f(x) = \frac{x-2}{x-1}$
- d)   $f(x) = \frac{x-2}{x+1}$
- e)   $f(x) = \frac{x+2}{x-1}$
- f)  None of the above

### Question 23

Find the function, whose graph is shown below



- a)   $f(x) = \frac{(x-1)(x-5)}{x-1}$
- b)   $f(x) = \frac{(x-1)(x+5)}{x-1}$
- c)   $f(x) = \frac{(x+1)(x-5)}{x+1}$
- d)   $f(x) = \frac{x-1}{(x-1)(x-5)}$
- e)   $f(x) = \frac{x-1}{(x-1)(x+5)}$
- f)  None of the above

**Question 24**

Write the equation  $10^x = 15$  in logarithmic form.

- a)   $e = \ln(15)$
- b)   $x = \log(15)$
- c)   $\ln(ex) = \ln(15)$

- d)   $x = \log(x)$
- e)   $x = \ln(15)$
- f)  None of the above

**Question 25**

Find the asymptote and the range of the given exponential function

$$f(x) = -4 \cdot 8^{x-4} - 5$$

- a)  Asymptote  $y = -5$ , Range =  $(-\infty, -5)$
- b)  Asymptote  $y = 5$ , Range =  $(5, \infty)$
- c)  Asymptote  $y = -5$ , Range =  $(-5, \infty)$
- d)  Asymptote  $y = 5$ , Range =  $(-\infty, 5)$
- e)  Asymptote  $y = 0$ , Range =  $(0, \infty)$
- f)  None of the above

**Question 26**

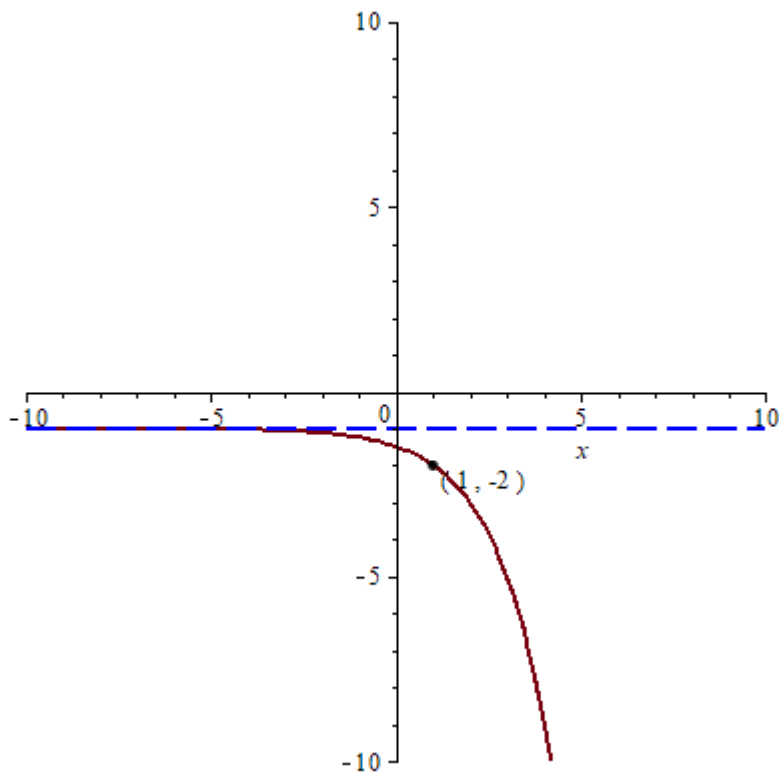
Find the asymptote and the domain of the given logarithmic function

$$f(x) = \ln(7x + 3) + 9$$

- a)  Asymptote  $x = \frac{3}{7}$ , Domain =  $(-\infty, \frac{3}{7})$
- b)  Asymptote  $x = -\frac{3}{7}$ , Domain =  $(-\infty, -\frac{3}{7})$
- c)  Asymptote  $x = -\frac{3}{7}$ , Domain =  $(-\frac{3}{7}, \infty)$
- d)  Asymptote  $x = \frac{3}{7}$ , Domain =  $(\frac{3}{7}, \infty)$
- e)  Asymptote  $x = 9$ , Domain =  $(-\infty, 9)$
- f)  None of the above

**Question 27**

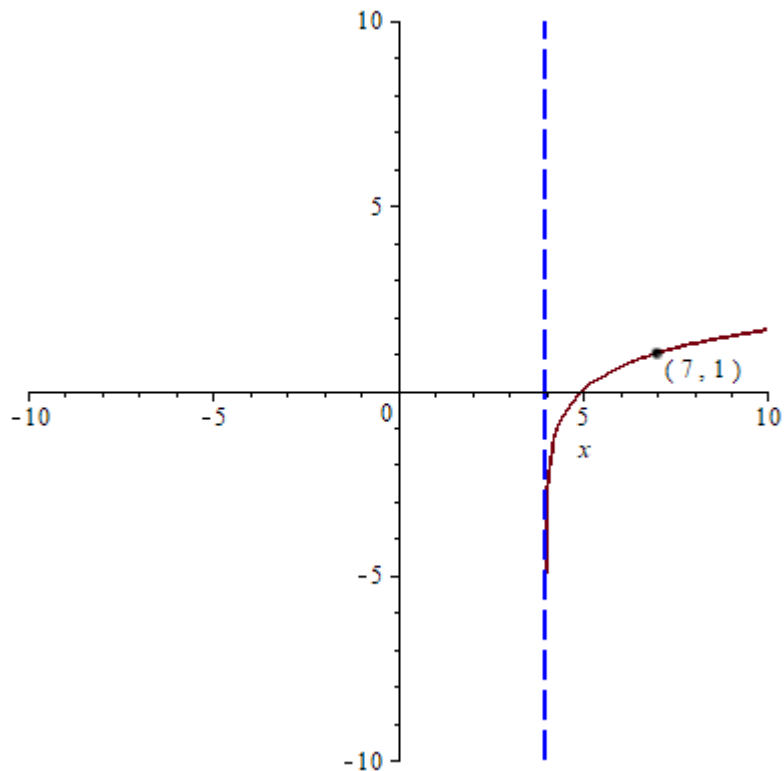
Which of the following functions corresponds to the graph?



- a)   $f(x) = -2^{x+1} - 1$
- b)   $f(x) = -2^{x+1} + 1$
- c)   $f(x) = -2^{x-1} - 1$
- d)   $f(x) = 2^{x-1} + 1$
- e)   $f(x) = -2^{x-1} + 1$
- f)  None of the above

**Question 28**

Find the function, whose graph is shown below



- a)   $f(x) = \log_4(x - 3)$
- b)   $f(x) = \log_4(x - 4)$
- c)   $f(x) = \log_3(x - 4)$
- d)   $f(x) = \log_4(x + 3)$
- e)   $f(x) = \log_3(x + 4)$
- f)  None of the above

**Question 29**

Suppose  $a > 1$ . Simplify

$$\log_a \left( \frac{1}{a^3} \right)$$

- a)  3
- b)  2
- c)  -2
- d)  -3

- e)  -1
- f)  None of the above

**Question 30**

Simplify the following expression:

$$\log_4(192) - \log_4(12)$$

- a)  3
- b)  2
- c)  -4
- d)  -2
- e)  4
- f)  None of the above