

# Sample Test 3

Name \_\_\_\_\_

In the real test you will have 10 questions and the following rules:

You have 50 minutes to complete the test below. The usage of books or notes, or communication with other students is not allowed. Ask me if you have questions.

*This is a multiple choice test. You do not have to justify your answer. If, however, you are not sure that your selection is correct, put a star (\*) in front of the question number, and include your calculations on an attached sheet. I will look at an attached calculation only if I see a star in front of the question number.*

*-If you mark an incorrect answer but your calculations contain only minor mistakes, you will get up to 75% credit for the problem.*

*-Beware: if you instruct me to look at a severely incorrect calculation, you will lose at least 50% of the credit, even if by chance you mark the correct answer. (No credit is given for an incorrect answer and totally incorrect calculations.)*

*You get full credit if you mark the correct answer, and mark no star, or if you mark the correct answer, express doubt by marking a star, but I find your calculations perfectly correct.*

Find the average rate of change for the function over the given interval.

1)  $f(x) = x^2 + 5x$  between  $x = 6$  and  $x = 9$

A) 20

B) 14

C) 42

D)  $\frac{20}{3}$

Give the domain of the function.

2)  $f(x) = \frac{\sqrt{x+5}}{(x+2)(x+5)}$

A)  $x > 0$

B)  $x \neq -5, x \neq -2, x \neq -5$

C) All real numbers

D)  $x \geq -5, x \neq -2, x \neq -5$

If the following defines a one-to-one function, find the inverse.

3)  $3x - y = 9$

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

B)  $f^{-1}(x) = \frac{x-9}{3}$

C)  $f^{-1}(x) = \frac{x+9}{3}$

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

Find the coordinates of the vertex of the parabola.

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

A) (-3, 6)

B) (-6, 3)

C) (6, -3)

D) (6, -9)

Find the equation of the axis of symmetry of the parabola.

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

A)  $x = 0$

B)  $x = -2$

C)  $x = 2$

D)  $y = -2$

Solve the problem.

6) A farmer has 1400 yards of fencing to enclose a rectangular garden. Express the area  $A$  of the rectangle as a function of the width  $x$  of the rectangle. What is the domain of  $A$ ?

A)  $A(x) = x^2 + 700x, 0 < x < 700$

B)  $A(x) = -x^2 + 1400x, 0 < x < 1400$

C)  $A(x) = -x^2 + 700x, 0 < x < 1400$

D)  $A(x) = -x^2 + 700x, 0 < x < 700$

- 7) A projectile is fired from a cliff 400 feet above the water at an inclination of  $45^\circ$  to the horizontal, with a muzzle velocity of 350 feet per second. The height  $h$  of the projectile above the water is given by  $h(x) = \frac{-32x^2}{(350)^2} + x + 400$ , where  $x$  is the horizontal distance of the projectile from the base of the cliff. Find the maximum height of the projectile.

- A) 1357.03 ft                      B) 3271.09 ft                      C) 1914.06 ft                      D) 957.03 ft

Find the  $x$ -intercepts and  $y$ -intercepts (if they exist).

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

- A)  $x$ -intercepts  $(0, -8)$  and  $(-8, 0)$ ;  $y$ -intercept  $(0,0)$                       B)  $x$ -intercepts  $(0, 0)$  and  $(8, 0)$ ;  $y$ -intercept  $(0,0)$   
 C)  $x$ -intercepts  $(0, 0)$  and  $(-8, 0)$ ;  $y$ -intercept  $(0,0)$                       D) No  $x$ -intercept;  $y$ -intercept  $(0,0)$

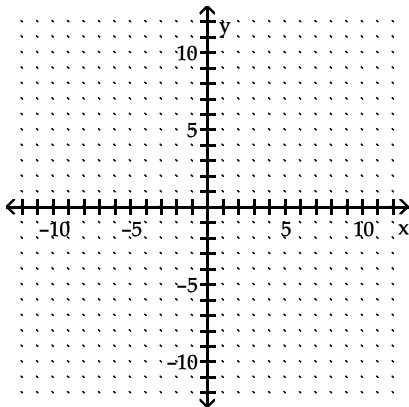
For the polynomial, list each real zero and its multiplicity. Determine whether the graph crosses or touches the  $x$ -axis at each  $x$ -intercept.

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

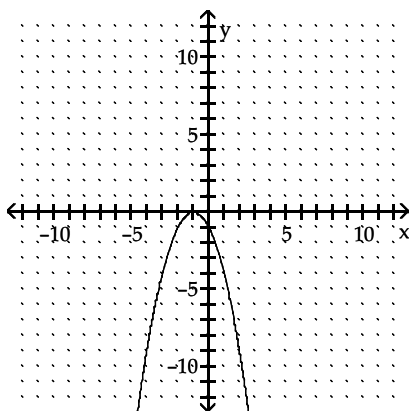
- A)  $-6$ , multiplicity 1, touches  $x$ -axis;  $6$ , multiplicity 2, crosses  $x$ -axis  
 B)  $-6$ , multiplicity 1, crosses  $x$ -axis;  $6$ , multiplicity 2, touches  $x$ -axis  
 C)  $6$ , multiplicity 1, touches  $x$ -axis;  $-6$ , multiplicity 2, crosses  $x$ -axis  
 D)  $6$ , multiplicity 1, crosses  $x$ -axis;  $-6$ , multiplicity 2, touches  $x$ -axis

Graph the function.

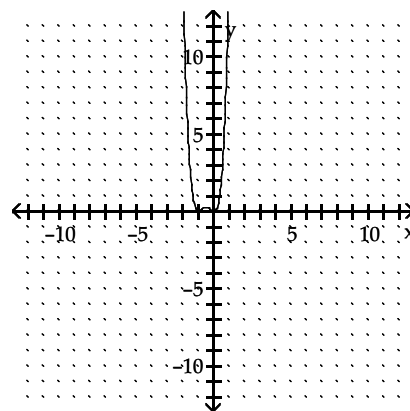
10)  $f(x) = -2x(x + 1)^2$



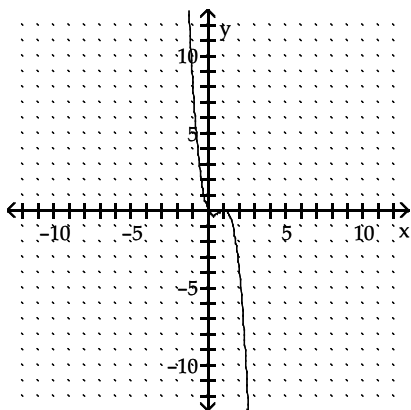
A)



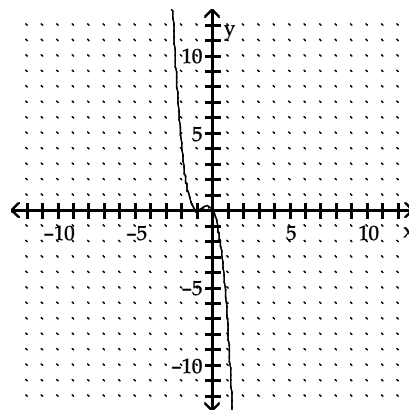
B)



C)

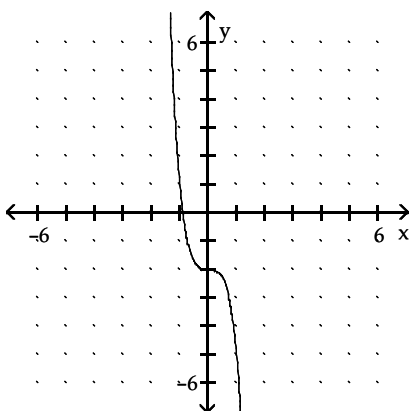


D)



Give the possible values for the degree of the polynomial and the sign (+ or -) of the  $x^n$  term.

11)



A) Degree is odd (3, 5, etc.);...  $x^n$  sign is negative.

C) Degree is even (2, 4, 6 etc.);...  $x^n$  sign is positive.

B) Can't identify degree;  $x^n$  sign is negative.

D) Degree is even (2, 4, 6, etc.);...  $x^n$  sign is negative.

Use synthetic division.

12)  $(3x^3 + 22x^2 + 22x - 12) \div (x + 6)$

A)  $3x + 4$

B)  $-3x^2 - 6x - 2$

C)  $\frac{1}{2}x^2 + \frac{11}{3}x + \frac{11}{3}$

D)  $3x^2 + 4x - 2$

Use the factor theorem to decide whether or not the second polynomial is a factor of the first.

13)  $5x^2 + 5x + 30; x - 3$

A) Yes

B) No

List the potential rational zeros of the polynomial function. Do not find the zeros.

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

A)  $\pm \frac{1}{6}, \pm \frac{1}{3}, \pm \frac{1}{2}, \pm \frac{2}{3}, \pm 1, \pm 2, \pm 3$

B)  $\pm \frac{1}{6}, \pm \frac{1}{3}, \pm \frac{1}{2}, \pm 1, \pm 2$

C)  $\pm \frac{1}{2}, \pm \frac{3}{2}, \pm 1, \pm 2, \pm 3, \pm 6$

D)  $\pm \frac{1}{6}, \pm \frac{1}{3}, \pm \frac{1}{2}, \pm \frac{2}{3}, \pm 1, \pm 2$

List all numbers that must be rejected as possible solutions.

15)  $\frac{12}{5x-7} + \frac{1}{x} = \frac{1}{7x+16}$

A)  $\frac{7}{5}, \frac{-16}{7}, -12$

B)  $0, \frac{7}{5}, \frac{-16}{7}, 12$

C)  $0, \frac{7}{5}, \frac{-16}{7}$

D)  $\frac{7}{5}, \frac{-16}{7}$

Give the equation of the specified asymptote(s).

16) Horizontal asymptote:  $h(x) = \frac{5x^2 - 9x - 6}{2x^2 - 2x + 3}$

A) None

B)  $y = \frac{9}{2}$

C)  $y = 0$

D)  $y = \frac{5}{2}$

17) Horizontal asymptote:  $g(x) = \frac{x^2 + 1x - 7}{x - 7}$

A)  $y = 7$

B) None

C)  $y = 1$

D)  $y = -1$

18) Horizontal asymptote:  $g(x) = \frac{x^2 + 4x - 8}{x - 8}$

A)  $y = 9$

B) None

C)  $y = 8$

D)  $y = -4$

19) Vertical asymptote(s):  $h(x) = \frac{(x-6)(x+2)}{x^2 - 1}$

A)  $x = 6, x = -2$

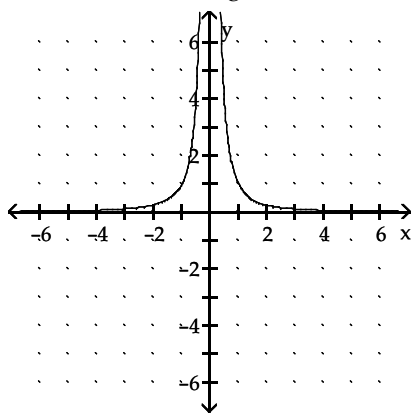
B) None

C)  $x = -6, x = 2$

D)  $x = 1, x = -1$

Match the correct function to a given graph.

20) Select the function given that matches the graph.



A)  $f(x) = \frac{1}{x}$

B)  $f(x) = \frac{1}{x^2}$

C)  $f(x) = \frac{1}{2x}$

D)  $f(x) = x^2$

Approximate each value using a calculator. Express answer rounded to three decimal places.

21)  $62.9$

A) 180.567

B) 17.4

C) 46,656

D) 594.823

## Answer Key

Testname: STEST3.TST

- 1) A
- 2) D
- 3) C
- 4) A
- 5) B
- 6) D
- 7) A
- 8) C
- 9) D
- 10) D
- 11) A
- 12) D
- 13) B
- 14) D
- 15) C
- 16) D
- 17) B
- 18) B
- 19) D
- 20) B
- 21) A