

## Sem1 final Practice

### Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- \_\_\_ 1. Identify the smallest subset of the real numbers that contains the number 0.5.
- integers
  - rational numbers
  - whole numbers
  - irrational numbers

- \_\_\_ 2. Determine which relation is a function.
- |        |    |   |   |   |
|--------|----|---|---|---|
| Input  | 1  | 2 | 3 | 4 |
| Output | -1 | 0 | 1 | 2 |

c.

Input	2	2	3	-1
Output	0	4	3	0

b.

Input	3	2	3	2
Output	2	0	3	0

d.

Input	1	1	1	2
Output	2	0	1	1

- \_\_\_ 3. Which is the correct recursive formula for the sequence?

$$\{6, 10, 14, 18, \dots\}$$

- $u_1 = 6; u_n = u_{n-1} + 4$
- $u_1 = 14; u_n = u_{n-1} - 26$
- $u_1 = 26; u_n = u_{n-1}$
- $u_1 = 4; u_n = u_{n-1} + 4$

- \_\_\_ 4. Select the correct description of the sequence:

$$\{-12, -17, -22, -27, -32, \dots\}$$

- Arithmetic with  $d = -17$
- Arithmetic with  $d = -5$
- Arithmetic with  $d = -22$
- Not arithmetic

- \_\_\_ 5. Find the  $k$ th partial sum of the arithmetic sequence  $\{u_n\}$  with a common difference  $d$ .

$$k = 10, u_1 = -1, d = 6$$

- 280
- 260
- 290
- 265

- \_\_\_ 6. Find an equation for the line satisfying the given conditions.

y-intercept 6 and slope  $\frac{9}{2}$

- $x = \frac{9}{2}y + 6$
- $y = -\frac{9}{2}x + 6$
- $x = -\frac{9}{2}y + 6$
- $y = \frac{9}{2}x + 6$

- \_\_\_ 7. Determine whether the sequence is arithmetic, geometric, or neither.

$$3, 5.6, 8.2, 10.8, 13.4, \dots$$

- geometric
- neither
- arithmetic

- \_\_\_ 8. Find the common ratio for geometric sequence  $10(5)^{n-1}$ .

- 5
- 8

b. 11  
8

d. 5

9. Use the  $x$ -intercept method to find all real solutions of the equation.

$$x^3 - 9x^2 + 20x - 12 = 0$$

a.  $x = 1, 2, \text{ or } -6$

b.  $x = -1, -2, \text{ or } -6$

c.  $x = -1, -2, \text{ or } 6$

d.  $x = 1, 2, \text{ or } 6$

10. Solve by taking the square root of both sides.

$$4(x-2)^2 - 252 = 0$$

a.  $x = -2 - 3\sqrt{7} \text{ or } 2 + 3\sqrt{7}$

b.  $x = 2 - 9\sqrt{7} \text{ or } 2 + 9\sqrt{7}$

c.  $x = -2 - 3\sqrt{7} \text{ or } -2 + 3\sqrt{7}$

d.  $x = 2 - 3\sqrt{7} \text{ or } 2 + 3\sqrt{7}$

11. Determine the nature of the roots:  $4x^2 + 32x + 64 = 0$

a. no real solutions

b. a unique real solution

c. two distinct real solutions

d. cannot be determined

12. Solve the equation.

$$5x = 3x^2 + 1$$

a.  $x = \frac{5 + \sqrt{13}}{12} \text{ or } \frac{5 - \sqrt{13}}{12}$

b.  $x = \frac{-5 + \sqrt{13}}{12} \text{ or } \frac{5 - \sqrt{13}}{12}$

c.  $x = \frac{-5 + \sqrt{13}}{6} \text{ or } \frac{5 - \sqrt{13}}{6}$

d.  $x = \frac{5 + \sqrt{13}}{6} \text{ or } \frac{5 - \sqrt{13}}{6}$

13. Find all real solutions of the equation  $\left| \frac{3}{6}x + 3 \right| + 8 = 9$ .

a.  $-1 \text{ or } -40$

b.  $8 \text{ or } -2$

c.  $40 \text{ or } 8$

d.  $-4 \text{ or } -8$

14. Find all real solutions of the equation  $\sqrt{x^2 + 6x - 12} = 2$ .

a.  $x = -8 \text{ or } 2$

b.  $x = -2 \text{ or } 8$

c.  $x = 8 \text{ or } 2$

d.  $x = -8 \text{ or } -2$

15. Find all real solutions of the equation  $0 = \frac{x^2 - 3x - 28}{x + 4}$ .

a.  $x = 7 \text{ or } 8$

b.  $x = 7 \text{ or } -8$

c.  $x = -7$

d.  $x = 7$

16. Which of the following represents  $1 < x \leq 6$ ?

a.  $[1, 6]$

b.  $(1, 6]$

c.  $(1, 6)$

d.  $[1, 6)$

17. Solve the inequality and express your answer in interval notation.

$$-10 \leq -2x + 6 \leq -2$$

a.  $[-4, 9]$

b.  $[4, 9]$

c.  $[-4, 8]$

d.  $[4, 8]$

18. Solve the inequality and express your answer in interval notation.

$$x^2 + 8x + 3 < 0$$

a.  $(-4 - \sqrt{13}, -4 + \sqrt{13})$

c.  $[-4 - \sqrt{13}, -4 + \sqrt{13}]$

b.  $(-\infty, -4 - \sqrt{13})$  or  $(-4 + \sqrt{13}, \infty)$       d.  $(-\infty, -4 - \sqrt{13}]$  or  $[-4 + \sqrt{13}, \infty)$

19. Determine the domain of the function.

$$h(x) = \frac{7x}{x(x^2 - 9)}$$

- a. All real numbers except 3.      c. All real numbers except  $\pm 9$ .  
 b. All real numbers except  $\pm 3$  and 0.      d. All real numbers except  $\pm 3$ .

20. Find all local maxima and minima and points of inflection of the function.

$$f(x) = -2x^3 + 6x^2 + 18x - 18$$

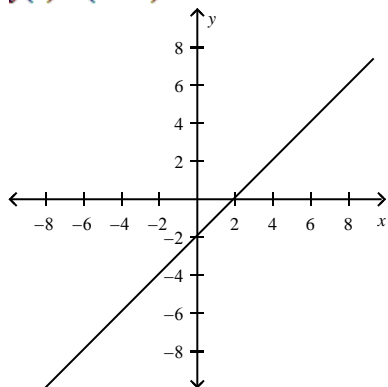
- a.  $x = -1$  is a local minimum,  $x = 3$  is a local maximum,  $x = 1$  is a point of inflection.  
 b.  $x = 1$  is a local minimum,  $x = -3$  is a local maximum,  $x = -1$  is a point of inflection.  
 c.  $x = 1$  and  $x = -3$  are local maxima,  $x = 1$  is a point of inflection.  
 d. None of these

21. Determine the  $x$ -intercepts of the quadratic function  $f(x) = (x - 5)(x - 4)$  and determine if its graph opens up or down.

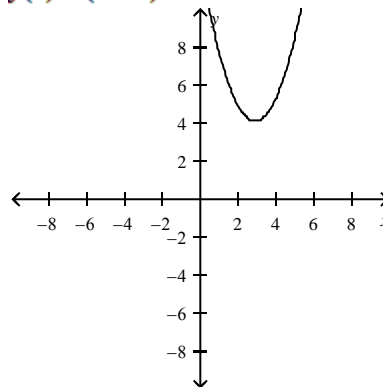
- a.  $x$ -intercepts: 5, 4; opens up      c.  $x$ -intercepts: 12, 5; opens up  
 b.  $x$ -intercept: 12; opens up      d.  $x$ -intercepts: 2, 5; opens up

22. Find the rule and the graph of the function whose graph can be obtained by performing the translation 3 units right and 4 units up on the parent function  $f(x) = x^2$ .

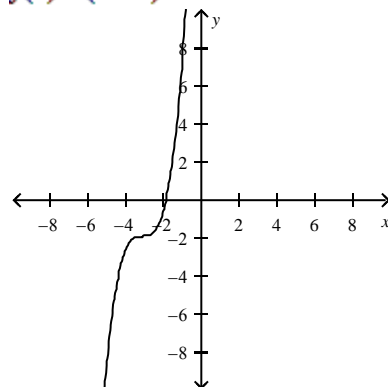
a.  $f(x) = (x - 5)^2 + 4$



c.  $f(x) = (x - 3)^2 + 4$



b.  $f(x) = (x + 3)^2 + 2$



d. None of these

23. Find the inverse of the function  $f(x) = \{(6, 27), (7, 15), (11, 5)\}$ .

a.  $\{(27, 6), (15, 7), (5, 11)\}$

c.  $\{(11, 7), (5, 15), (11, 27)\}$

b.  $\{(15, 6), (11, 7), (27, 5)\}$

d. None of these

24. Find the inverse of the function  $f(x) = \frac{8x-6}{15}$ .

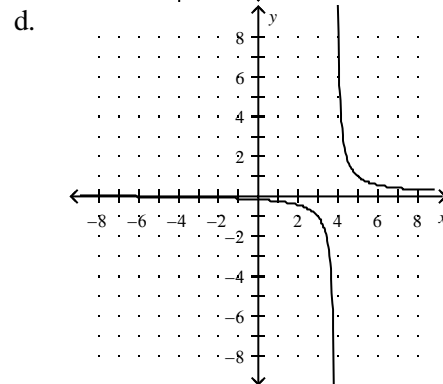
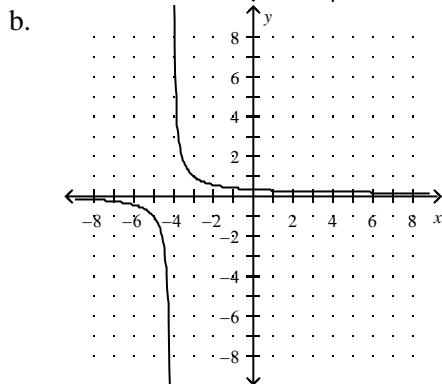
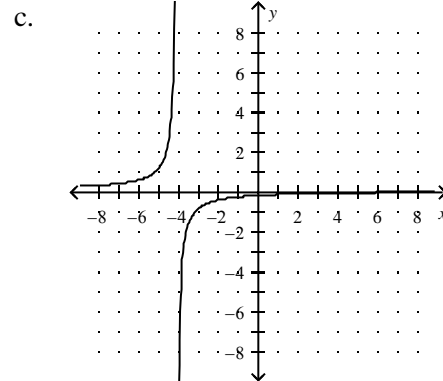
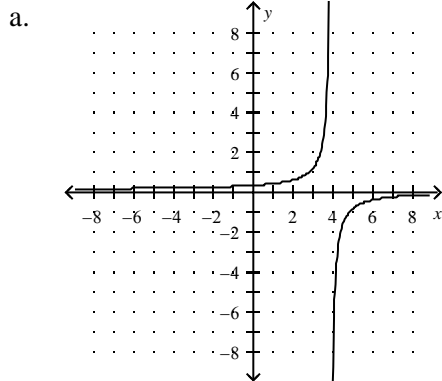
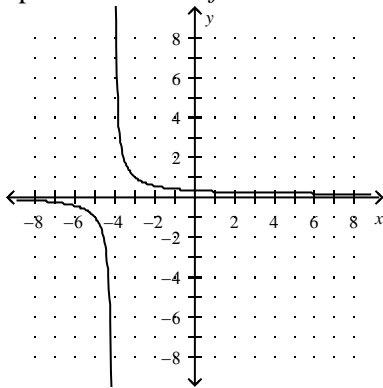
a.  $g(x) = \frac{17x+6}{8}$

c.  $g(x) = \frac{8}{15x+6}$

b.  $g(x) = \frac{15x+6}{8}$

d.  $g(x) = 15x+6$

25. The graph of a function  $f$  is illustrated below. Which is the graph of the inverse function of  $f$ ?



26. Which of the following is *not* a polynomial?

a.  $\sqrt{3}$

c.  $x^2 - 7$

b.  $x^2 - 7 + 5x$

d.  $\frac{7}{x} + \frac{x}{5}$

27. Which is the quotient and remainder found when dividing  $-4x^3 + 2x^2 + 14x - 9$  by  $2x - 4$ ?

a. Quotient  $-2x^2 - 3x + 1$ ; remainder  $-5$

c. Quotient  $-2x^2 + 3x - 1$ ; remainder  $5$

b. Quotient  $-2x^2 + 3x - 2$ ; remainder  $-1$

d. Quotient  $-2x^2 - 3x + 2$ ; remainder  $-1$

28. Determine the maximum number of zeros of the polynomial function

$-8x^4 - x^2 + 2$ .

a. 2

c. 1

b. 3

d. 4

29. Use the Factor Theorem and a calculator to factor the polynomial.

$5x^3 - 15x^2 + x - 3$

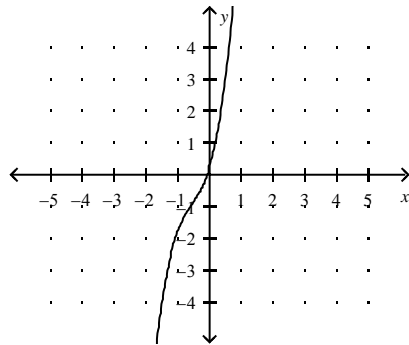
a.  $(5x^2 + 2)(x - 3)$

c.  $x(5x^2 - 3x - 3)$

b.  $(x - 3)(5x^2 + 1)$

d.  $(x - 15)(5x^2 - 1)$

30. Use your knowledge of polynomial functions to match one of the functions to the graph below.



a.  $-2x^3 + 3x^2 - 3$

c.  $2x^3 + 3x^2 + 3x$

b.  $-2x^3 + 3x^3 - 3$

d.  $2x^3 + 3x^3 + 3$

31. Determine the domain of the function  $f(x) = \frac{x^2 - 9x + 14}{x^2 + 10x + 21}$ .

a. All real numbers except 2 and 7

c. All real numbers except  $-7$  and  $-3$

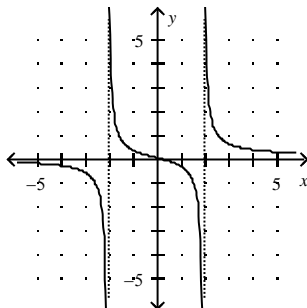
b. All real numbers except  $-2$  and  $-7$

d. All real numbers except 7 and 3

32. Which graph is correct, including all  $x$ -intercepts, holes, and asymptotes of the function

$\frac{x^2 - x}{(x+2)(x-2)(x-1)}$  ?

a.



c.

