REV-FG-2324-ASM-SET 1-MATH
Suggested solutions

Multiple Choice Questions

1. A	2. C	3. C	4. D	5. D
6. C	7. C	8. A	9. B	10. A
11. A	12. D	13. A	14. C	15. B
16. C	17. D	18. C	19. C	20. B
21. D	22. A	23. C	24. A	25. C
26. C	27. B	28. C	29. D	30. D

1. A

Function parts	Related restrictions	Conclusion
Square root	Non-negative real numbers	$x - 4 \geq 0$
Fraction	Denominator $\neq 0$	$\sqrt{x-4} \neq 0$

We have $x > 4$.

2. C

Function of $x \quad \Rightarrow \quad$ for each value of x, there is **only one** value of y.
For each vertical line (same x), there is only one intersection with the graph (one value of y).
The answer is C.

3. C

$$\begin{aligned} 3f(2) - 1 &= 3[2^2 - 3(2) + 17] - 1 \\ &= 44 \end{aligned}$$

4. D

$$\begin{aligned} f(x) - f\left(\frac{1}{x}\right) &= \left(x - \frac{1}{x}\right) - \left(\frac{1}{x} - x\right) \\ &= 2\left(x - \frac{1}{x}\right) \end{aligned}$$

5. D

$$\begin{aligned} f(x-1) &= 2(x-1)^2 + 1 \\ &= 2x^2 - 4x + 3 \end{aligned}$$

6. C

$$f(c) + f(-c) = [(c)^3 + (-c)^3] + c[(c)^2 + (-c)^2] + [c + c]$$
$$= c(2c^2) + (2c)$$
$$= 2c^3 + 2c$$

7. C

$$f(x+1) - f(x) = [(x+1)^2 - (x)^2] - [(x+1) - (x)] + [1 - 1]$$
$$= (2x + 1) - 1$$
$$= 2x$$

8. A

$$f(5) - f(3) = [5^2 - 3^2] + 2[5 - 3] + [k - k]$$
$$= 16 + 4$$
$$= 20$$

9. B

$$f(2) \cdot f(-2) = (a + 2b)(a - 2b)$$
$$= a^2 - 4b^2$$

10. A

$$\begin{cases} f(0) = 1 = h(-3) + k \\ f(8) = 1 = (8 + h)(5) + k \end{cases}$$

Solving, we have $h = -5$ and $k = -14$.

11. A

$$f(1) = f(-1)$$
$$\frac{a}{1} + b + c(1) + d(1)^2 = \frac{a}{-1} + b + c(-1) + d(-1)^2$$
$$2a + 2c = 0$$
$$a + c = 0$$

12. D

$$g(-1) = g(7)$$
$$(-1)^2 - 2k(-1) + 1 = (7)^2 - 2k(7) + 1$$
$$2 + 2k = 50 - 14k$$
$$k = 3$$

13. A

$$f(2) = f(1) - 1$$
$$2^2 + 2a(2) - 12 = (1 + 2a - 12) - 1$$
$$a = -2$$

14. C

$$f(4) - f(3) = 21$$
$$[4^2 - 3^2] + k[4 - 3] + [7 - 7] = 21$$
$$7 + k = 21$$
$$k = 14$$

15. B

$$f(x) = g(x)$$
$$5 + 2x = x^2 - x - 5$$
$$0 = x^2 - 3x - 10$$
$$x = 5 \quad \text{or} \quad -2$$

16. C

Sign	Graph	Conclusion
$a < 0$	open downwards	
$b > 0$	slope at y-intercept is positive	A ✗ and B ✗
$c < 0$	y-intercept is negative	$ac > 0$ and D ✗

The answer is C.

17. D

Graph	Conclusion
Open downwards	$a < 0$
y-intercept > 0	$b > 0$

The answer is D.

18. C

Graph	Conclusion
Open upwards	$m > 0$
y-intercept < 0	$n < 0$

The answer is C.

19. C

Graph	Conclusion
Open downwards	$m < 0$
y-intercept > 0	$n > 0$

The answer is C.

20. B

We have $c = 5$.

Let the other x-intercept be β.

Then 1 and β are roots of $x^2 + bx + 5 = 0$.

Product of roots $= 1\beta = \dfrac{5}{1}$

$\beta = 5$

Equation of axis of symmetry is

$$x = \frac{1+5}{2}$$

$$x = 3$$

21. D

Coordinates of vertex are $(-1,\ 1)$.

Vertex of the graph lies in the second quadrant.

y-intercept $= -2(0+1)^2 + 1$

$= -1 < 0$

The answer is D.

22. A

Axis of symmetry is $x = -5$.

23. C

$y = (px + 5)^2 + q$

$= p^2\left(x + \dfrac{5}{p}\right)^2 + q$

Coordinates of vertex are $\left(-\dfrac{5}{p},\ q\right)$.

Vertex $\left(-\dfrac{5}{p},\ q\right)$ lies in quadrant III, we have $\dfrac{-5}{p} < 0$ and $q < 0$.

Thus, $p > 0$ and $q < 0$.

24. A

Coordinates of vertex are $(-h,\ k)$.

$-h < 0$ and $k > 0$

$h > 0$

25. C

Coordinates of V are $(5,\ -9)$.

$0 = (x-5)^2 - 9$

$x - 5 = \pm\sqrt{9}$

$x = 2$ or 8

Coordinates of A and B are $(2,\ 0)$ and $(8,\ 0)$ respectively.

Required area $= \dfrac{(8-2)(9)}{2}$

$= 27$

26. C

Coordinates of vertex are $(1,\ 1)$.

Vertex of the graph lies in the first quadrant.

The answer is C.

27. B

Coordinates of vertex are $(-h,\ k)$.

$-h < 0$ and $k < 0$

$h > 0$

The answer is B.

28. C

Coordinates of vertex are $(h,\ -1)$.

$8 = (0-h)^2 - 1$

$h = -3$ or 3 (rejected)

Axis of symmetry is $x = -3$.

29. D

y-intercept $= (0+2)^2 - 1$

$= 3 \neq -1$

The answer is D.

30. D

A. ✗. y-intercept $= 29 - (0-2)^2 = 25$

B. ✗. When $x = -3$, $y = 29 - (-3-2)^2 = 4 \neq 22$.

C. ✗. Vertex is $(2,\ 29)$.

D. ✓. $0 = 29 - (x-2)^2$

$x = 2 \pm \sqrt{29}$

END OF PAPER