

Pre-Calculus
1st Semester Exam Review 2

1. If $f(x)$ is a linear function and $f(-2)=4$ and $f(6)=1$, find an equation for $f(x)$ in terms of x .

$$m = \frac{1-4}{6-(-2)} = \frac{-3}{8} \quad y = mx + b \quad b = \frac{13}{4}$$

$$f(x) = \frac{-3}{8}x + \frac{13}{4}$$

2. Simplify $(-3+i)(5-2i)$.

$$-13 + 11i$$

3. Solve the equation $x^4 - 2 = x^2$.

$$x = \pm\sqrt{2}, \pm i$$

4. True or false: The parabola $y = -2x^2 + 2x + 1$ opens up.

- (a) True
(b) False

5. True or false: The set of points in the table describes a function.

- (a) True
(b) False

x	2	4	3
y	3	1	3

6. If $f(x) = \frac{2x-3}{x^2}$, evaluate $f(3-2i)$.

$$\frac{3-4i}{5-12i} \cdot \frac{(5+12i)}{(5+12i)} = \frac{63+16i}{169}$$

*When $3x^3 + 6x^2 - 2x + 1$ is divided by $x+1$, ...

7. the quotient is: $3x^2 + 3x - 5$ 8. The remainder is:

$$\begin{array}{r} -1 \overline{) 3 \ 6 \ -2 \ 1} \\ \underline{-3 \ -3 \ 5} \\ 3 \ 3 \ -5 \ 6 \end{array}$$

$$6$$

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*For the graph of $y = x^3 - 9x$:

9. Identify the zeros of the function.

$$y = x(x^2 - 9)$$
$$y = x(x-3)(x+3)$$
$$x=0 \quad x=3 \quad x=-3$$

10. The graph lies above the x -axis on which interval(s)?

$$-3 < x < 0 \text{ or } 3 < x$$

11. Use a graphing calculator to find the real roots of $x^3 - 3x^2 + 7 = 0$ to the nearest tenth.

$$x \approx -1.3$$

12. If $3 + i\sqrt{2}$ is one root of $x^3 - 25x + 66 = 0$, find the other two roots.

$$x = 3 - i\sqrt{2}, -6$$

$$\text{sum} = 0$$

$$3 - i\sqrt{2} + 3 + i\sqrt{2} + x = 0$$

$$6 + x = 0$$
$$x = -6$$

13. Solve the inequality $\frac{2-x}{3} < \frac{3-2x}{5}$.

$$5(2-x) < 3(3-2x)$$
$$10 - 5x < 9 - 6x$$
$$x < -1$$

14. Which is/are true about the function $y = 2|x| + 1$?

(a) Domain = $\{x | x \neq 0\}$

(b) Domain = $\{\text{all real numbers}\}$

(c) Range = $\{y | y > 1\}$ $y \geq 1$

(d) $f(2) = 5$

(e) None of the above

B & D

*If $f(x) = x^2 + 1$:

15. Find $f(f(-3))$

$$f(-3) = 10$$

$$f(f(-3)) = f(10) = 101$$

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16. The volume formula for a cylinder is $V(r, h) = \pi r^2 h$. When drawing a curve with constant height $h = 3$ cm, name two points lies on the curve of Volume versus radius. *some examples:*

$$V = \pi r^2 (3)$$

$$V = 3\pi r^2$$

r	2	5	1
V	12π	75π	3π

17. Give the solution(s) of the inequality $(x-1)(x+5)(x-3) < 0$.

$$x=1 \quad x=-5 \quad x=3$$



$$x < -5 \text{ or } 1 < x < 3$$

18. Write the equation for a quadratic function with a root at -3 and another root at 2 , containing the point $f(1) = -4$.

$$\downarrow$$
$$x+3$$

$$\downarrow$$
$$x-2$$

$$f(x) = a(x+3)(x-2)$$

$$-4 = a(1+3)(1-2)$$

$$-4 = a(4)(-1)$$

$$-4 = -4a$$

$$a = 1$$

$$f(x) = (x+3)(x-2)$$

