

PRACTICE FINAL EXAM - SEMESTER 1

Read each question carefully. Circle one response.

1. Given $5a - 3bc = 15$, solving for c would yield

- a) $c = \frac{5a+15}{3b}$
- b) $c = 15 - 5a - 3b$
- c) $c = \frac{5a-15}{-3b}$
- d) $c = \frac{-5a+15}{-3b}$

$$\begin{array}{r} 5a - 3bc = 15 \\ -5a \quad -5a \\ \hline -3bc = 15 - 5a \\ \hline -3b \quad -3b \\ \hline c = \frac{15 - 5a}{-3b} \end{array}$$

2. Given $xz = wr + t$, solving for r would yield

- a) $r = xz - t - w$
- b) $r = xz + t + w$
- c) $r = \frac{xz-t}{w}$
- d) $r = \frac{xz+t}{w}$

$$\begin{array}{r} xz = wr + t \\ -t \quad -t \\ \hline xz - t = wr \\ \hline \frac{xz-t}{w} = \frac{wr}{w} \end{array} \quad \rightarrow \quad r = \frac{xz-t}{w}$$

3. Solve $x^2 - 10x + 24 = 0$

- a) $x = 4, 6$
- b) $x = -4, -6$
- c) $x = 3, 8$
- d) $x = -3, -8$

$$\begin{array}{l} (x-4)(x-6) = 0 \\ x-4=0 \quad x-6=0 \\ x=4 \quad x=6 \end{array}$$

4. Solve $|7x + 4| = 10$

- a) $x = -2$
- b) $x = -2, 2$
- c) $x = -2, \frac{6}{7}$
- d) $x = 2, -\frac{6}{7}$

$$\begin{array}{l} 7x + 4 = \pm 10 \\ 7x + 4 = 10 \quad 7x + 4 = -10 \\ -4 \quad -4 \quad -4 \quad -4 \\ \hline 7x = 6 \quad 7x = -14 \\ \frac{7x}{7} = \frac{6}{7} \Rightarrow x = \frac{6}{7} \quad \frac{7x}{7} = \frac{-14}{7} \Rightarrow x = -2 \end{array}$$

5. Solve $\sqrt{2x + 5} - 3 = 2$

- a) $x = 10$
- b) $x = -10, 10$
- c) $x = 2$
- d) $x = 20$

$$\begin{array}{l} \sqrt{2x+5} - 3 = 2 \\ +3 \quad +3 \\ \hline \sqrt{2x+5} = 5 \\ (\sqrt{2x+5})^2 = (5)^2 \\ 2x+5 = 25 \\ -5 \quad -5 \\ \hline 2x = 20 \\ \frac{2x}{2} = \frac{20}{2} \quad x = 10 \end{array}$$

6. Solve $\frac{8}{9} = \frac{2}{x}$

- a) $x = \frac{11}{8}$
- b) $x = \frac{3}{8}$
- c) $x = \frac{8}{18}$
- d) $x = \frac{18}{8}$

$$\begin{array}{l} \frac{8}{9} = \frac{2}{x} \\ 8x = 18 \\ \frac{8x}{8} = \frac{18}{8} \\ x = \frac{18}{8} \end{array}$$

7. Solve $-3x = 2 - 4(x + 1)$

- a) 1
- b) -2
- c) $\frac{2}{7}$
- d) $\frac{6}{7}$
- e) 2

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

8. Solve $\frac{5}{7} - \frac{8x}{7} = 4$

- a) $\frac{8}{23}$
- b) $\frac{31}{56}$
- c) $\frac{20}{8}$
- d) $-\frac{23}{8}$

$$\begin{aligned} \frac{5}{7} - \frac{8x}{7} &= 4 \\ 5 - 8x &= 28 \\ \frac{5 - 8x}{7} &= \frac{28}{1} \\ 5 - 8x &= 28 \end{aligned}$$
$$\begin{aligned} 5 - 8x &= 28 \\ -5 & \quad -5 \\ \hline -8x &= 23 \\ \frac{-8x}{-8} &= \frac{23}{-8} \\ x &= \frac{23}{-8} \end{aligned}$$

9. The transformation $f(x - 1)$ can be described as

- a) A horizontal shift right
- b) A horizontal shift left
- c) A vertical shift up
- d) A vertical shift down

10. A reflection about the y-axis can be denoted as

- a) $-f(-x)$
- b) $f(-x)$
- c) $-f(x)$
- d) $f(x) - 1$

11. The transformation $f(x) + 1$ can be described as

- a) A vertical shift up
- b) A vertical shift down
- c) A horizontal shift right
- d) A horizontal shift left

12. The transformation $g(x) = \sqrt{2x}$ can be described as

- a) A vertical stretch
- b) A horizontal stretch
- c) A vertical compression
- d) A horizontal compression

13. The parent function $f(x) = x^2$ is vertically compressed by a factor of $\frac{1}{4}$ and translated 2 units right and 3 units up. Select the quadratic function that represents these transformations.

- a) $g(x) = \frac{1}{4}(x-2)^2 + 3$
 b) $g(x) = 4(x-2)^2 + 3$
 c) $g(x) = \frac{1}{4}(x+2)^2 + 3$
 d) $g(x) = (4x+2)^2 - 3$

$$\frac{1}{4}(x-2)^2 + 3$$

14. David paints. A local distributor wants to contract David for his art work. The distributor will pay David \$200 per painting. In addition, they will give him a signing bonus of \$1000. The equation that models David's income from his art work is....

- a) $y = 200x^2 + 1000$
 b) $y = 1000x + 200$
 c) $y = 200x + 1000$
 d) $y = 200x - 1000$

$$y = 200x + 1000$$

15. Emma wants to start offering horseback riding lessons. She has one horse and plans to charge by the lesson. If she made \$1,170 after selling 13 lessons, what was the rate of change?

- a) \$90/hour
 b) 90 hours/\$
 c) \$90/lesson
 d) 13 lessons/day

$$\frac{\$1170}{13 \text{ lessons}} = \$90/\text{lesson}$$

16. If Emma sold \$1980 worth of lessons in 7 days, what is the rate of change?

- a) \$282.86/day
 b) \$90/lesson
 c) \$282.86/week
 d) \$90/week

$$\frac{\$1980}{7 \text{ days}} = \$282.86/\text{day}$$

17. Given the table of values below, calculate the average rate of change on [3, 8].

Profit (\$)	450	546	210	698	1994	5630
Time (weeks)	3	4	5	6	7	8

- a) -\$1036/week
 b) \$1036/week
 c) \$386/week
 d) -\$386/week

$$\text{ara} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5630 - 450}{8 - 3} = 1036$$

18. Given $f(x) = \frac{1}{2}x^3 - 4$, find the average rate of change on [2, 4].

- a) $\frac{1}{14}$
 b) $-\frac{1}{14}$
 c) 14
 d) -14

$$f(x_1) = \frac{1}{2}(2)^3 - 4 = 4 - 4 = 0$$

$$f(x_2) = \frac{1}{2}(4)^3 - 4 = 32 - 4 = 28$$

$$\text{ara} = \frac{28 - 0}{4 - 2} = 14$$

19. The inverse of $f(x) = 6x + 1$ is

- a) $f^{-1}(x) = 6x + 1$
- b) $f^{-1}(x) = -x - 6$
- c) $f^{-1}(x) = \frac{x-1}{6}$
- d) $f^{-1}(x) = \frac{x+1}{-4}$

$$x = 6y + 1$$
$$\frac{x-1}{6} = \frac{6y}{6}$$

$$f^{-1}(x) = \frac{x-1}{6}$$

20. Which of the following functions has an inverse that is a function?

- a) $gh(x) = (x - 8)^6 + 19$
- b) $g(x) = .75x^{73} + 1$
- c) $k(x) = 5 + 3x^{44}$
- d) $f(x) = x^2 - 8$

21. A function $g(x)$ has a domain of $[5, \infty)$ and a range of $(-\infty, \infty)$. The domain and range of $g^{-1}(x)$ is

- a) $D: (-\infty, \infty), R: [5, \infty)$
- b) $D: (-\infty, \infty), R: (5, \infty)$
- c) $D: (5, \infty), R: (-\infty, \infty)$
- d) $D: [5, \infty), R: (-\infty, \infty)$

22. The inverse relation of $S = \{(-4, 6), (3, 2), (4, 0), (8, -3), (-1, 6)\}$ is

- a) $S^{-1} = \{(6, -4), (2, 3), (0, 4), (-3, 8), (6, -1)\}$
- b) $S^{-1} = \{(-6, 4), (2, 3), (0, 4), (3, -8), (-6, 1)\}$
- c) $S^{-1} = (6, -4), (3, 2), (0, 4), (-3, 8), (6, -1)$
- d) $S^{-1} = \{(-6, 4), (-2, -3), (0, -4), (3, -8), (-6, 1)\}$

23. Referring to question #22, is S^{-1} a function?

- a) yes
- b) no

24. The inverse of $f(x) = \frac{1}{2}x^3 + 3$ is

- a) $f^{-1}(x) = \sqrt[3]{\frac{1}{2}x - 3}$
- b) $f^{-1}(x) = \pm \sqrt[3]{2x - 6}$
- c) $f^{-1}(x) = \pm \sqrt[3]{\frac{1}{2}x - 6}$
- d) $f^{-1}(x) = \sqrt[3]{2x - 6}$

$$x = \frac{1}{2}y^3 + 3$$
$$2(x - 3) = \left(\frac{1}{2}y^3\right) \cdot 2$$
$$\sqrt[3]{2x - 6} = \sqrt[3]{y^3}$$
$$f^{-1}(x) = \sqrt[3]{2x - 6}$$

25. Referring to question #24, is $f^{-1}(x)$ a function?

- a) yes
- b) no