

Math 99 – Spring 2007
Sample Problems for the Final Exam

1. Rationalize the denominator in the expression $\frac{6}{\sqrt{2}-2}$.

(a) $3\sqrt{2} - 6$

(b) $\frac{\sqrt{2}-2}{6}$

(c) $\frac{\sqrt{2}-1}{3}$

(d) $-3\sqrt{2} - 6$

2. Let $f(x) = (x+6)^2 - 12$. Find all values of x for which $f(x) = 0$.

(a) $6 \pm 2\sqrt{3}$

(b) $-6 - 2\sqrt{3}$

(c) $-6 \pm 2\sqrt{3}$

(d) $-6 + 2\sqrt{3}$

3. The solution set of $\sqrt[3]{x^3 + 72} - 6 = x$ is

(a) $\{-6\}$

(b) $\{-4, -2\}$

(c) $\{4, -2\}$

(d) $\{-4\}$

4. The expression $(3\sqrt{2} + \sqrt{3})(2\sqrt{3} - \sqrt{2})$ is equal to

(a) 5

(b) $5\sqrt{6}$

(c) 15

(d) $3\sqrt{6}$

5. Solve the following system of equations.

$$\begin{cases} 2x - 5y = 8 \\ 6x - 15y = 24 \end{cases}$$

- (a) $(-6, -4)$
- (b) dependent system
- (c) $(9, 2)$
- (d) inconsistent system

6. The area of a rectangle is 216 square centimeters. If the length is 6 centimeters less than twice the width, find the width of the rectangle.

- (a) 11 cm
- (b) 12 cm
- (c) 8 cm
- (d) none of the above

7. Simplify the following expression. Assume that x and y are positive.

$$(36x^6y^{-2})^{\frac{1}{2}}$$

- (a) $-6x^{\frac{11}{2}}y^{\frac{5}{2}}$
- (b) $\frac{6x^3}{y}$
- (c) $-\frac{6}{x^3}$
- (d) $\frac{36x^3}{y^2}$

8. If $L = a + 2d(n - 3)$, solve for d .

- (a) $d = 2L - 2a - 2(n - 3)$
- (b) $d = \frac{L}{2a} - \frac{(n - 3)}{2}$
- (c) $d = \frac{L - a}{2n - 6}$
- (d) none of the above

9. The solution set of $\frac{3}{x^2} + \frac{11}{x} - 4 = 0$ is

(a) $\left\{-3, \frac{1}{4}\right\}$

(b) $\left\{-\frac{1}{4}, 3\right\}$

(c) $\left\{\frac{1}{4}, 3\right\}$

(d) $\left\{-3, -\frac{1}{4}\right\}$

10. The solution set of the equation $\sqrt{2x-1} - 8 = -x$ is

(a) $\{5\}$

(b) $\{13\}$

(c) $\{5, 13\}$

(d) \emptyset

11. Solve the absolute value equation $|3x - 4| - 6 = 7$.

(a) $\left\{\frac{17}{3}\right\}$

(b) $\{-3\}$

(c) $\{3\}$

(d) $\left\{-3, \frac{17}{3}\right\}$

12. The expression $\frac{x^{-3} - y^{-3}}{x^{-1} - y^{-1}}$ simplifies to

(a) $x^{-2} - y^{-2}$

(b) $\frac{x^2 + xy + y^2}{x^2y^2}$

(c) $\frac{x^2 - xy + y^2}{x^2y^2}$

(d) $x^2 + xy + y^2$

13. Solve the equation $x^2 - 5x = -1$.

- (a) $\frac{5 \pm \sqrt{21}}{2}$
- (b) no real solution
- (c) $-1, 4$
- (d) $\frac{-5 \pm \sqrt{21}}{2}$

14. Rationalize the denominator: $\frac{x-1}{1+\sqrt{x}}$

- (a) $\sqrt{x} - 1$
- (b) \sqrt{x}
- (c) $-\sqrt{x} - 1$
- (d) $\frac{(\sqrt{x} - 1)(x + 1)}{x - 1}$

15. Rationalize the denominator: $\frac{2}{\sqrt{5} + 2}$

- (a) $\sqrt{5} - 4$
- (b) $2\sqrt{5} - 2$
- (c) $2\sqrt{5} - 4$
- (d) $\sqrt{5} - 2$

16. Simplify the expression $(\sqrt{10} - 3)^3$.

- (a) $37\sqrt{10} - 117$
- (b) $10\sqrt{10} - 27$
- (c) $19 - 6\sqrt{10}$
- (d) $\sqrt{10} - 3$

17. The expression $\frac{x^2 - 3x + 2}{x^2 + x - 6} \div \frac{x^3 + x^2 - 2x}{x^2 + 5x + 6}$ simplifies to

(a) $\frac{(x - 1)(x + 3)}{x(x + 1)(x - 3)}$

(b) $\frac{x - 1}{x(x + 1)}$

(c) $\frac{1}{x}$

(d) $\frac{x + 3}{x(x + 3)}$

18. If the length of one side of a rectangle is 15 in, and the length of its diagonal is 17 in, then find its area.

(a) 120 in²

(b) 127.5 in²

(c) 255 in²

(d) 64 in²

19. How many gallons of an 18% citric acid solution should be mixed with 25 gallons of a 10% citric acid solution to obtain a mixture of 13% citric acid solution?

(a) 11 gallons

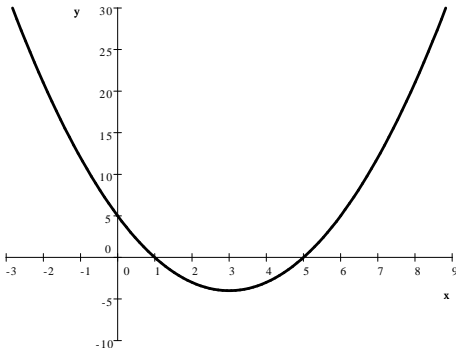
(b) 15 gallons

(c) 60 gallons

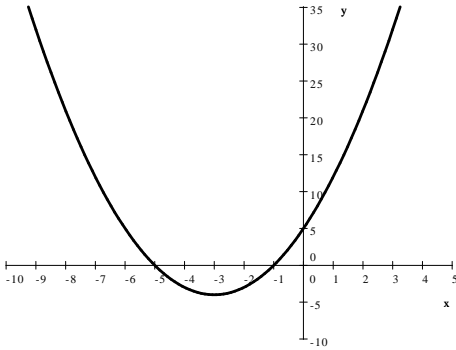
(d) 21 gallons

20. Which one is the graph of the quadratic equation $y = x^2 - 4x - 5$?

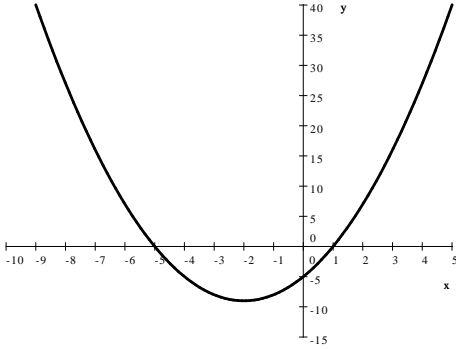
(a)



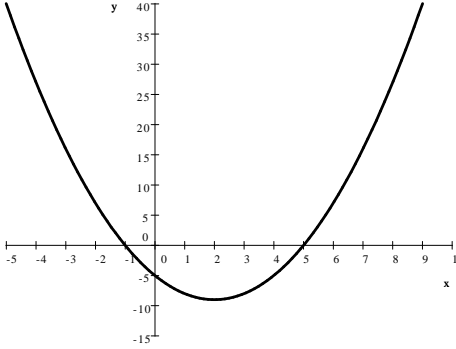
(b)



(c)



(d)



Answers:

- | | | | |
|----|---|----|---|
| 1 | d | 11 | d |
| 2 | c | 12 | b |
| 3 | b | 13 | a |
| 4 | b | 14 | a |
| 5 | b | 15 | c |
| 6 | b | 16 | a |
| 7 | b | 17 | c |
| 8 | c | 18 | a |
| 9 | b | 19 | b |
| 10 | a | 20 | d |