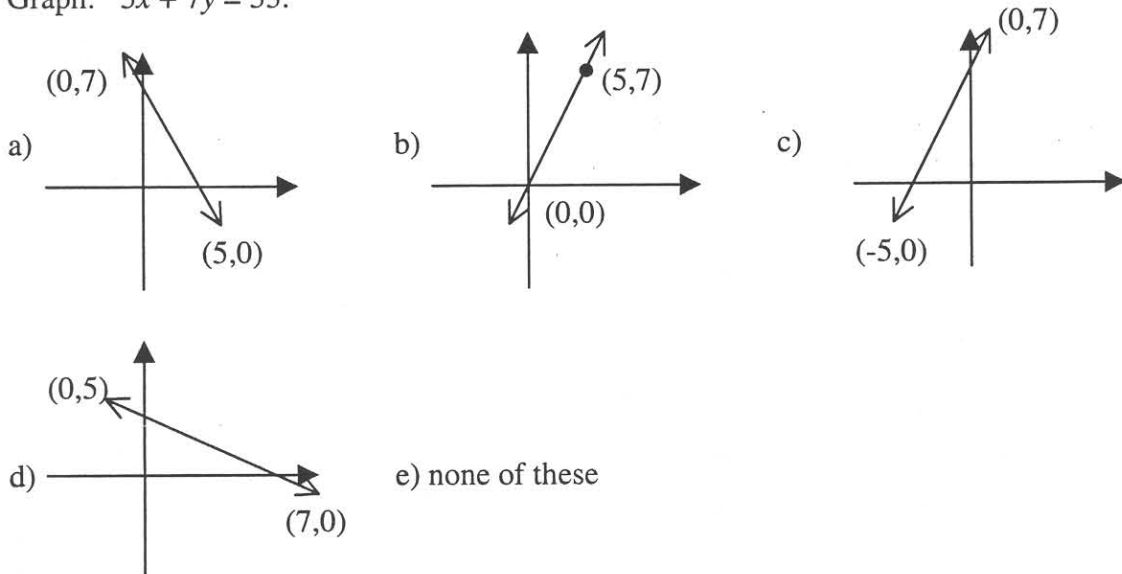


**Mathematics Competency Sample Exam – Ver 03**

1. Tanya has 21 coins consisting of nickels and dimes amounting to \$1.75. How many dimes does she have?  
 a) 14                      b) 12                      c) 10                      d) 8                      e) 7

2. Divide:  $(2x^2 + 3x - 14) \div (x - 2)$   
 a)  $2x + 7$                       b)  $2x^2 - 10$                       c)  $-x - 7$                       d)  $2x - 7 - \frac{28}{x - 2}$                       e) none of these

3. Graph:  $5x + 7y = 35$ .



4. Perform the indicated operation and simplify:  $\frac{x^2 - 3x}{x + 3} \cdot \frac{x^2 + 5x + 6}{x^2 - x - 6}$   
 a)  $x$                       b)  $\frac{x + 2}{-2}$                       c)  $\frac{x(x - 3)}{x + 3}$                       d)  $\frac{x(x - 3)^2}{(x + 3)^2}$                       e)  $\frac{x(x + 3)(x + 1)}{(x + 3)(x - 1)}$

5. Simplify  $\frac{\sqrt{2x}}{\sqrt{12y}}$   
 a)  $\frac{\sqrt{6xy}}{6y}$                       b)  $\frac{\sqrt{24xy}}{12y}$                       c)  $\frac{x\sqrt{6y}}{y}$                       d)  $\frac{\sqrt{xy}}{y}$                       e)  $\frac{3\sqrt{xy}}{y}$

6. Solve:  $\frac{x}{x - 1} + \frac{2}{x + 1} = \frac{8}{3}$   
 a)  $x = \frac{-1}{2}, 3$                       b)  $x = -2, \frac{1}{5}$                       c)  $x = -5, -3$                       d)  $x = \frac{-1}{5}, 2$                       e)  $x = 0, 5$

7. Find the equation of the line going through the points (-6, 7) and (2,2).

a)  $8x - 5y = -26$

b)  $5x - 4y = 13$

c)  $5x + 8y = 26$

d)  $4x - 5y = -11$

e)  $8x + 5y = -13$

8. Solve:  $3x^2 - 2x - 4 = 0$

a)  $x = \frac{-2 - \sqrt{52}}{6}, \frac{-2 + \sqrt{52}}{6}$

b)  $x = \frac{1 - \sqrt{13}}{3}, \frac{1 + \sqrt{13}}{3}$

c)  $x = \frac{1 - \sqrt{11}}{3}, \frac{1 + \sqrt{11}}{3}$

d)  $x = \frac{-4}{3}, \frac{2}{3}$

e)  $\emptyset$

9. Combine:  $\frac{3}{x^2 + 3x - 4} - \frac{4}{x^2 - 6x - 40}$

a)  $\frac{-x - 26}{(x-1)(x+4)(x-10)}$

b)  $\frac{-x - 11}{(x-1)(x+4)(x-10)}$

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

d)  $\frac{7x - 26}{(x-1)(x+4)(x-10)}$

e)  $\frac{-x + 34}{(x-1)(x+4)(x-10)}$

10. Multiply:  $(12x - 5)^2$

a)  $24x^2 - 10$

b)  $144x^2 - 25$

c)  $144x^2 + 25$

d)  $144x^2 - 60x + 25$

e)  $144x^2 - 120x + 25$

11. Solve:  $\sqrt{2y - 3} = 3$

a)  $y = 18$

b)  $y = 6$

c)  $y = 3$

d)  $y = 0$

e) none of these

12. Solve for x and y:  $\begin{cases} 5x + 3y = 7 \\ 2x + 4y = 0 \end{cases}$

a)  $x = -1, y = 2$

b)  $x = 0, y = 1$

c)  $x = 1, y = 0$

d)  $x = 2, y = -1$

e)  $x = 3, y = -2$

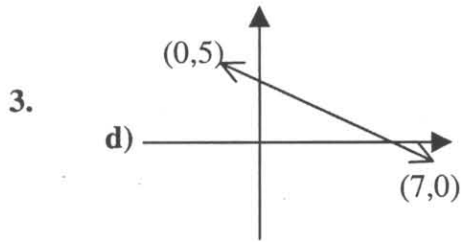
13. Simplify:  $\frac{\frac{1}{x} + \frac{2}{y}}{\frac{1}{x^2} - \frac{2}{y}}$
- a)  $\frac{y-2x^2}{xy+2x^2}$       b)  $\frac{1}{x}$       c)  $\frac{xy+2x^2}{y-2x^2}$       d)  $x$       e)  $\frac{y+2x}{y-2x^2}$
14. Solve:  $\frac{3}{4}x + \frac{1}{5} = \frac{3}{10}$
- a)  $x = 2$       b)  $x = -\frac{2}{3}$       c)  $x = -\frac{1}{15}$       d)  $x = \frac{2}{15}$       e)  $x = \frac{5}{3}$
15. Simplify:  $(-3x^2y^3)^2 (-x^2y)^3$
- a)  $6x^{10}y^9$       b)  $-9x^{10}y^9$       c)  $3x^{10}y^9$       d)  $-6x^{12}y^{12}$       e)  $9x^{12}y^{12}$
16. Solve:  $-5 < 2y - 7$
- a)  $y < 1$       b)  $y > 1$       c)  $y > -1$       d)  $y < -6$       e)  $y > -6$
17. Simplify:  $\left(\frac{3}{4}\right)^{-2}$
- a)  $\frac{6}{8}$       b)  $-9$       c)  $\frac{-9}{16}$       d)  $\frac{16}{9}$       e)  $\frac{16}{-9}$
18. Multiply:  $(3\sqrt{7} - \sqrt{3})(\sqrt{7} + 2\sqrt{3})$
- a)  $27 + 7\sqrt{21}$       b)  $27 + 5\sqrt{21}$       c)  $15 + 5\sqrt{21}$       d)  $-15 - \sqrt{21}$
- e)  $27 - 5\sqrt{21}$
19. Four cheeseburgers and five milkshakes cost a total of \$8.35. Two milkshakes cost \$0.35 more than one cheeseburger. Find the cost of a cheeseburger.
- a) \$0.75      b) \$1.74      c) \$3.13      d) \$1.15      e) none of these
20. Find the product and simplify:  $(2x-1)(6x^2+5x+3)$
- a)  $12x^3 - 3$       b)  $12x^3 + 4x^2 + 11x + 3$       c)  $12x^3 + 4x^2 + x - 3$       d)  $12x^3 + 15x + 3$
- e) none of these

# Mathematics Competency Sample Exam

## Answer sheet

1. a) 14

2. a)  $2x + 7$



4. a)  $x$

5. a)  $\frac{\sqrt{6xy}}{6y}$

6. d)  $x = \frac{-1}{5}, 2$

7. c)  $5x + 8y = 26$

8. b)  $x = \frac{1 - \sqrt{13}}{3}, \frac{1 + \sqrt{13}}{3}$

9. a)  $\frac{-x - 26}{(x - 1)(x + 4)(x - 10)}$

10. e)  $144x^2 - 120x + 25$

11. b)  $y = 6$

12. d)  $x = 2, y = -1$

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

14. d)  $x = \frac{2}{15}$

15. b)  $-9x^{10}y^9$

16. b)  $y > 1$

17. d)  $\frac{16}{9}$

18. c)  $15 + 5\sqrt{21}$

19. d) \$1.15 for a cheeseburger

20. c)  $12x^3 + 4x^2 + x - 3$