

Youngstown State University Mathematics Placement Test

***** Practice Version #1 *****

Do not write on this exam

This exam consists of three parts:

(1) Basic Skills, (2) Elementary Algebra, and (3) Intermediate Algebra with Trigonometry

Section 1 - Basic Skills

1. The expression $\frac{8 - 15}{4 - 5}$ simplifies to

- (a) -7 (b) 7 (c) -1 (d) 5 (e) 6

2. The sum of $\frac{1}{4}$ and $\frac{1}{7}$ is

- (a) $\frac{1}{11}$ (b) $\frac{2}{11}$ (c) $\frac{1}{14}$ (d) 11 (e) $\frac{11}{28}$

3. Find the value of $12 - 6(12 - 15) + 8$.

- (a) -91 (b) -67 (c) -37 (d) -10 (e) 38

4. What is 20% of 16?

- (a) 80 (b) 3.2 (c) 0.80 (d) 0.32 (e) 12.8

5. Find the value of $-6.32 + 4.55$.

- (a) -10.87 (b) -2.23 (c) -1.87 (d) -1.77 (e) 1.77

6. The base of a triangle measures 8 inches. What is the height of the triangle (in inches) if the area A is 64 square inches? Note: $A = \frac{1}{2} \times \text{base} \times \text{height}$.

- (a) 2 (b) 3 (c) 4 (d) 8 (e) 16

7. The product of 4 and the difference of 12 and 7 is
(a) -56 (b) 9 (c) 20 (d) 41 (e) 76
8. Bottles of juice are shipped in cases that hold 8 bottles each. If 75 bottles of juice are available to fill as many cases as possible, how many bottles would be left over?
(a) 1 (b) 3 (c) 5 (d) 7 (e) 9
9. What is $\frac{7}{8} \div \frac{4}{21}$?
(a) $\frac{1}{6}$ (b) $\frac{147}{32}$ (c) $\frac{147}{2}$ (d) $\frac{3}{2}$ (e) $\frac{32}{147}$
10. Which of the following numbers is the largest?
(a) $\sqrt{3}$ (b) $\frac{207}{100}$ (c) $\frac{21}{8}$ (d) 2.500 (e) $(0.9)^{10}$

Section 2 - Elementary Algebra

11. Solve for x : $7x + 13 = -5$
(a) $-\frac{18}{7}$ (b) $\frac{18}{7}$ (c) $-\frac{8}{7}$ (d) $\frac{8}{7}$ (e) $\frac{12}{13}$
12. Simplify the expression $7(x + 3) - 2(y - 5) - 10x$.
(a) $3x - 2y + 31$ (b) $-3x - 2y + 11$ (c) $-3x - 2y + 31$ (d) $17x - 2y + 31$ (e) $17x - 2y + 11$
13. A certain cookie recipe calls for 7 cups of flour for every 4 cups of sugar. If a large mixture uses 84 cups of flour, how many cups of sugar are needed?
(a) 12 (b) 16 (c) 28 (d) 48 (e) 147
14. The cost C (in dollars) of producing n items at a factory is given by $C = 56 + 3n(n - 1)$. The cost of producing 4 items is
(a) \$92 (b) \$97 (c) \$204 (d) \$271 (e) \$708

15. The expression $(8x^3 + 5x^2 - 7) - 3(4x^3 - 7x^2 + 6x - 4)$ simplifies to
- (a) $x^3 + 26x^2 - 25x + 12$ (b) $20x^3 - 2x^2 + 6x - 11$ (c) $20x^3 + 12x^2 - 6x - 3$
 (d) $-4x^3 + 26x^2 - 18x + 5$ (e) $-4x^3 + 12x^2 - 6x - 3$
16. The expression $\frac{x-3}{x^2-9} \cdot \frac{x^2+6x+9}{4x+12}$ simplifies to
- (a) -1 (b) $\frac{1}{4}$ (c) $-\frac{1}{4}$ (d) $-\frac{3x}{2}$ (e) 1
17. If (x, y) satisfies both of the equations $2x + 7y = 11$ and $2x - 7y = -5$, then x is
- (a) $\frac{3}{2}$ (b) 4 (c) $-\frac{13}{2}$ (d) -1 (e) $\frac{8}{7}$
18. The inequality $7x + 8 < 10x - 3$ is equivalent to
- (a) $x < \frac{5}{17}$ (b) $x > -\frac{11}{3}$ (c) $x < -\frac{11}{3}$ (d) $x > \frac{11}{3}$ (e) $x < \frac{11}{3}$
19. $(3r^6s^5)(-4r^2s^3)$ is equal to
- (a) $-r^4s^2$ (b) $-12r^8s^8$ (c) $-12r^{16}s^{15}$ (d) $25r^{11}s^{10}$ (e) $-25r^{10}s^{11}$
20. If 7 is multiplied by the sum of a number n and 5, the result can be represented by
- (a) $7n + 5$ (b) $12n$ (c) $(7+n)5$ (d) $7(n+5)$ (e) $7+5n$
21. An equation of the line passing through the points A=(2, -9) and B=(-3, 6) is
- (a) $y = -\frac{1}{3}x - \frac{25}{3}$ (b) $y = -\frac{1}{3}x - \frac{29}{3}$ (c) $y = -3x + 3$ (d) $y = 3x - 15$ (e) $y = -3x - 3$
22. The solutions of the equation $x^2 + 10x + 16 = 0$ are
- (a) 8 and -8 (b) -8 and -2 (c) -8 and 2 (d) 8 and -2 (e) 8 and 2

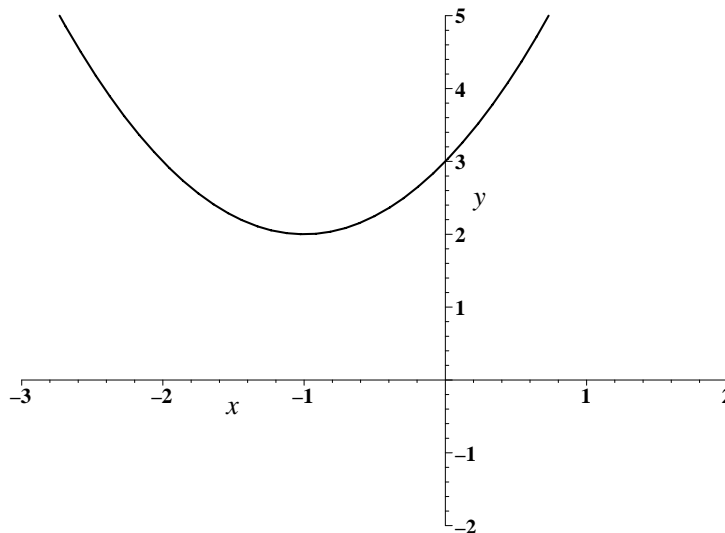
23. The expression $(-4x^{-3}y^3)^2(3x^4y)$ simplifies to

- (a) $-12x^3y^6$ (b) $-12xy^7$ (c) $\frac{48y^7}{x^2}$ (d) $48x^3y^6$ (e) $-\frac{48y^7}{x^2}$

24. If $\frac{10}{x-4} = 6$, then x equals

- (a) $-\frac{5}{12}$ (b) $\frac{7}{3}$ (c) $\frac{17}{2}$ (d) 14 (e) $\frac{17}{3}$

25. Which of the equations given is represented by the graph shown?



- (a) $y = (x + 1)^2 + 2$ (b) $y = (x + 1)^2 - 2$ (c) $y = (x - 1)^2 + 2$ (d) $y = x^2 + 2x - 2$
(e) $(y - 1)^2 = x - 2$

26. If $(6x + 3)(2x - 7) = 0$, solve for x .

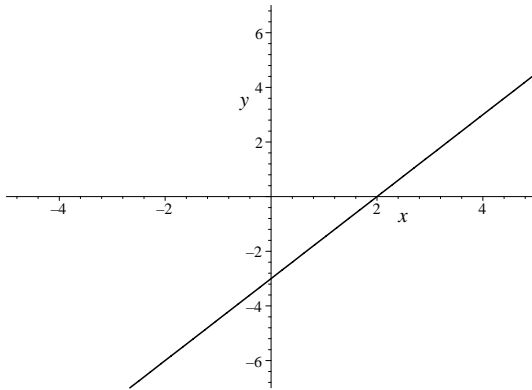
- (a) $x = \frac{1}{2}$ or $x = -\frac{7}{2}$ (b) $x = -\frac{1}{2}$ or $x = \frac{7}{2}$ (c) $x = -\frac{1}{2}$ or $x = -\frac{7}{2}$
(d) $x = 2$ or $x = -\frac{2}{7}$ (e) $x = -2$ or $x = \frac{2}{7}$

27. A rectangle has a width that is 7 meters shorter than its length. What is its length if the perimeter of the rectangle is 50 meters? [Note that $P=2(l+w)$]

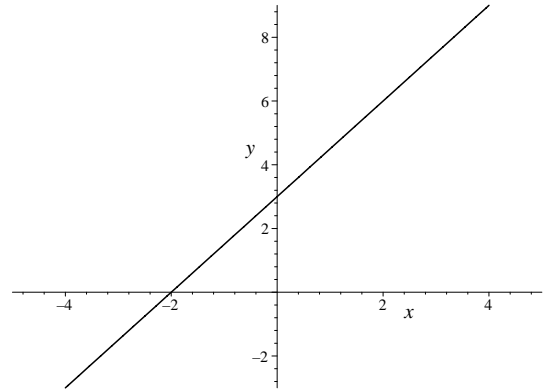
- (a) 4 (b) 9 (c) 12.5 (d) 16 (e) 32

28. Of the following, which best represents the graph of the equation $3x - 2y = -6$?

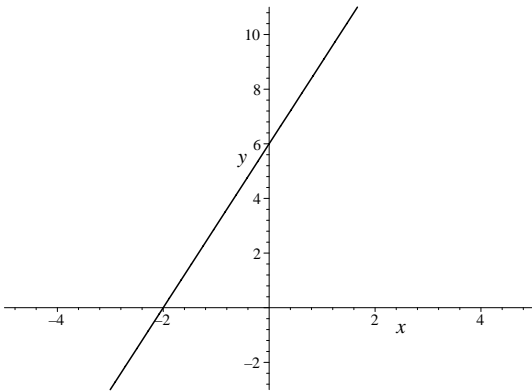
(a)



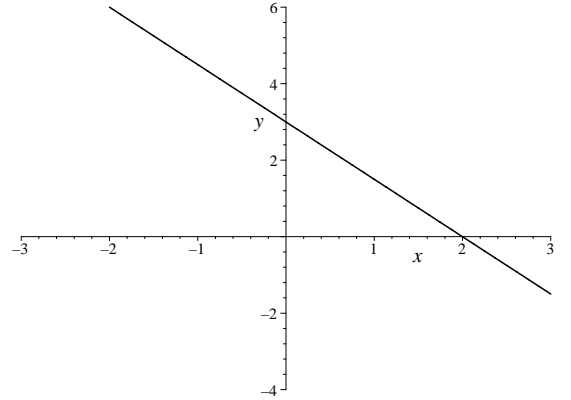
(b)



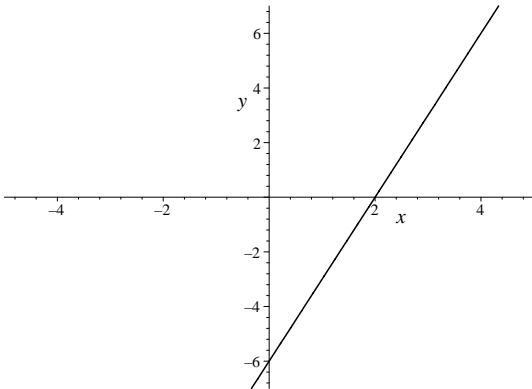
(c)



(d)



(e)



29. The expression $\frac{4x - 14}{x^2 - 2x - 24} - \frac{3}{x + 4}$ simplifies to

- (a) $\frac{3x - 8}{(x + 4)(x - 6)}$ (b) $\frac{1}{x + 6}$ (c) $\frac{7x - 32}{(x + 4)(x - 6)}$ (d) $\frac{1}{x - 6}$ (e) $\frac{x - 20}{(x - 6)(x + 4)}$

30. Joe bought an automobile tire for \$79.20. If the tire was discounted 10% off the original price, what was the original price of the tire?

- (a) \$88 (b) \$89.20 (c) \$79.20 (d) \$87.12 (e) \$79.30

Section 3 - Intermediate Algebra with Trigonometry

31. One factor of $5x^3 + 7x^2 - 6x$ is

- (a) $5x - 6$ (b) $5x + 6$ (c) $x - 6$ (d) $5x + 3$ (e) $x + 2$

32. The expression $\frac{\sqrt{x}\sqrt[3]{x}}{x^2}$ simplifies to

- (a) x^2 (b) $x^{-\frac{7}{6}}$ (c) x^{-7} (d) $x^{\frac{1}{12}}$ (e) $x^{\frac{5}{12}}$

33. The quadratic equation $x^2 - 3x - 1 = 0$ is satisfied when x is

- (a) $\frac{3 \pm \sqrt{13}}{2}$ (b) $\frac{3 \pm \sqrt{10}}{2}$ (c) $\frac{3 \pm 2\sqrt{2}}{2}$ (d) $3 \pm \sqrt{13}$ (e) $\frac{3 \pm \sqrt{5}}{2}$

34. If $|x + 1| \leq 3$, then

- (a) $-4 \leq x \leq 2$ (b) $-4 \leq x \leq 4$ (c) $-2 \leq x \leq 2$ (d) $-2 \leq x \leq 4$ (e) $2 \leq x \leq 4$

35. A right triangle has hypotenuse of length 6 and one leg of length 4. What is the length of the remaining side?

- (a) 20 (b) $2\sqrt{13}$ (c) $2\sqrt{5}$ (d) 52 (e) $\sqrt{6} - 2$

36. The inequality $\frac{3x - 2}{x + 1} < 0$ is satisfied when

- (a) $x < \frac{2}{3}$ only (b) $x < -1$ only (c) $x > \frac{2}{3}$ or $x < -1$ (d) $-1 < x < \frac{2}{3}$ (e) $-\frac{2}{3} < x < 1$

37. Solve for M in the equation $G = \frac{G + M}{Mt}$. Then M equals

- (a) $\frac{G + M}{Gt}$ (b) $\frac{G}{Gt - 1}$ (c) $\frac{1}{t - 1}$ (d) $\frac{G - Mt}{G}$ (e) $\frac{Gt - 1}{G}$

38. The expression $\frac{(4-x)(x+3)+x^2-9}{(4-x)(x+3)}$ simplifies to
- (a) $x^2 - 9$ (b) $x^2 - 8$ (c) $\frac{1}{4-x}$ (d) $x - 3$ (e) $\frac{x-3}{4-x}$
39. A rectangular box (with both top and bottom) has a square base with an area of 16. The volume of the box is 48. The surface area of the box is
- (a) 28 (b) 32 (c) 48 (d) 80 (e) 234
40. The graph of the equation $y = \frac{4x}{x^2 - 16}$ has a vertical asymptote whose equation is
- (a) $x = 16$ (b) $y = 0$ (c) $y = 4$ (d) $x = -4$ (e) $y = -4$
41. The equation $x^2 + y^2 - 4x - 6y - 3 = 0$ describes a circle with
- (a) center (2, 3) and radius 4 (b) center (2, 3) and radius 16
(c) center (-2, -3) and radius 4 (d) center (-2, -3) and radius 16
(e) center (0, 0) and radius $\sqrt{3}$
42. If $f(x) = 3x + 2$ and $g(x) = 3x^2$, then $(f(g(x)))$ equals
- (a) $9x^2 + 2$ (b) $27x^2 + 36x + 12$ (c) $3x^2 + 2$ (d) $9x^3 + 6x^2$ (e) $3x^2 + 6$
43. The largest set of real numbers in the domain of the function $f(x) = \frac{1}{\sqrt{8-x^3}}$ is
- (a) $x < -2$ (b) $x \leq -2$ (c) $x \neq 2$ (d) $x < 2$ (e) $x \leq 2$
44. The expression $\frac{\frac{1}{x+1} - \frac{1}{x}}{x}$ simplifies to
- (a) $-\frac{1}{x+1}$ (b) $\frac{1}{x^2(x+1)}$ (c) $\frac{1}{x}$ (d) $-\frac{1}{x^2(x+1)}$ (e) $\frac{1}{x(x+1)}$

45. A rectangle R has width x and length y . A new rectangle S is formed by multiplying the width of R by 4 and multiplying the length of R by 3. S has how much more area than R ?

- (a) $2xy$ (b) $3xy$ (c) $7xy$ (d) $11xy$ (e) $12xy$

46. Suppose that $\log_a x = 9$, $\log_a y = 3$ and $\log_a z = 1.5$. Then $\log_a \left(\frac{y^3 \sqrt{x}}{z} \right)$ equals

- (a) 9 (b) 10.5 (c) 12 (d) 21 (e) 54

47. The value of $\cos \left(\frac{7\pi}{3} \right)$ is

- (a) $-\frac{\sqrt{3}}{2}$ (b) $-\frac{1}{2}$ (c) 0 (d) $\frac{1}{2}$ (e) $\frac{\sqrt{3}}{2}$

48. $\cos(t - \pi)$ equals

- (a) $-\sin t$ (b) $\sin t$ (c) -1 (d) $-\cos t$ (e) $\cos t$

49. When the expression $\tan t + \cot t$ is defined, it is equivalent to

- (a) 1 (b) $\frac{1}{\sin t \cos t}$ (c) $\sin t \cos t$ (d) $\sin t + \cos t$ (e) $\frac{1}{\sin t} + \frac{1}{\cos t}$

50. Suppose that $\sin t = \frac{3}{5}$, where $0 < t < \frac{\pi}{2}$. Then $\cot t$ equals

- (a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) $\frac{5}{3}$ (d) $\frac{4}{5}$ (e) $\frac{5}{4}$

Answers:

- | | | | | |
|--------------|--------------|--------------|--------------|--------------|
| 1. b | 11. a | 21. e | 31. e | 41. a |
| 2. e | 12. c | 22. b | 32. b | 42. a |
| 3. e | 13. d | 23. c | 33. a | 43. d |
| 4. b | 14. a | 24. e | 34. a | 44. d |
| 5. d | 15. d | 25. a | 35. c | 45. d |
| 6. e | 16. b | 26. b | 36. d | 46. c |
| 7. c | 17. a | 27. d | 37. b | 47. d |
| 8. b | 18. d | 28. b | 38. c | 48. d |
| 9. b | 19. b | 29. d | 39. d | 49. b |
| 10. c | 20. d | 30. a | 40. d | 50. b |