

Mathematics Test Video Problems

Pre-Algebra and Elementary Algebra

Fractions

1. $1\frac{1}{2} - [(\frac{1}{4} \times \frac{1}{3}) + (\frac{1}{6} \div \frac{2}{5})] =$

- A. $\frac{7}{16}$
- B. 1
- C. $\frac{59}{60}$
- D. $\frac{3}{12}$
- E. $\frac{1}{5}$

Percent Word Problems

2. John's gross monthly salary is \$2,000. Starting next month, John receives a 15% raise per month. Also starting next month, 30% of his monthly paycheck is withheld for taxes. What will John's net monthly income be next month, after adding the raise and deducting taxes?

- F. \$2210
- G. \$2000
- H. \$1700
- J. \$1610
- K. \$1400

Averages

3. Sue had an overall average in her physics class of 80, based on 5 tests. Four of these test scores were 75, 75, 80, and 85. What was her fifth test score?

- A. 90
- B. 87
- C. 85
- D. 80
- E. 75

Key Facts

4. 25 freshmen and sophomores were given an English test. The 10 freshmen had an average score of 80 while the 15 sophomores had an average score of 90. What was the average score for all 25 students who took the test?

F. 87
G. 86
H. 85
J. 84
K. 83

Constructing Formulae from Word Problems

5. The down payment, d , on a house is calculated by taking 10% of the selling price, s , adding \$500 for each interest point, p , and a fixed amount for attorney fees, a . In terms of a formula, the down payment on a house is calculated by:

A. $d = 10s + 500 + a$
B. $d = .10s + 500 + a$
C. $d = 10s + .5p + a$
D. $d = 10s + 500p + a$
E. $d = .10s + 500p + a$

Rearranged x 's and y 's

6. Which of the following is equivalent to $4c + 5d - (2c + 3d)$?

F. $2c + 2d$
G. $2c + 8d$
H. $6c + 2d$
J. $6c + 8d$
K. $6c + 6d$

7. For all x , $(x - 3)^2 + (x + 4)^2 = ?$

A. $x^2 + 2x + 25$
B. $x^2 + 14x + 25$
C. $2x^2 + 2x + 7$
D. $2x^2 + 14x + 25$
E. $2x^2 + 2x + 25$

Key Facts

Factoring

8. Which of the following is the complete factorization of $2x^3y + 8x^2y + 6xy$?

- F. $2xy(x + 1)(x + 4)$
- G. $2xy(x + 2)(x + 2)$
- H. $2xy(x+1)(x+3)$
- J. $2x^2y(x + 2)(x+2)$
- K. $2x^2y(x + 1)(x + 3)$

Solving Equations

9. What is the value of $4x^2 - 8x - 5$ when $x = -1$?

- A. -17
- B. -9
- C. 1
- D. 7
- E. 17

10. $\frac{1}{3} - \frac{1}{9} = y + 1\frac{2}{3}$

- F. $-\frac{17}{9}$
- G. $-\frac{13}{9}$
- H. $-\frac{11}{9}$
- J. $\frac{13}{9}$
- K. $\frac{17}{9}$

Radicals and Square Roots

11. $4\sqrt{20} - 3\sqrt{45} = ?$

- A. $-9\sqrt{5}$
- B. $-5\sqrt{5}$
- C. $-\sqrt{5}$
- D. $\sqrt{5}$
- E. $9\sqrt{7}$

Exponents and Powers of 10

12. Which of the following is equal to

$$\frac{(4 \times 10^3)(.6 \times 10^5)}{(.3 \times 10^{10})}$$

- F. $.8 \times 10^{-2}$
- G. $.8 \times 10^2$
- H. $.8 \times 10^5$
- J. 8×10^{-2}
- K. 8×10^2

Key Facts

Formula Substitution

13. The formula for calculating simple interest is expressed as $I = prt$. If $p = \$4000$, $r = 10\%$, and $t = 2$, calculate I .
- A. 800
 - B. 1600
 - C. 2400
 - D. 8000
 - E. 80,000

Intermediate Algebra and Coordinate Geometry

Absolute value

14. What is the sum of the solutions of the equation $|2x - 4| = 6$?
- F. -1
 - G. 0
 - H. 1
 - J. 4
 - K. 5

Inequalities

15. Which of the following is the solution to $-4x + 3 \leq -x + 6$?
- A. $x \leq -3$
 - B. $x \leq -1$
 - C. $x \geq -1$
 - D. $x \geq 3$
 - E. $x \geq 9$

Negative and Zero Exponents

16. $(-4)^2 + 4^0 + (-4)^{-2} = ?$
- F. $-17\frac{1}{16}$
 - G. $-15\frac{1}{16}$
 - H. $17\frac{1}{16}$
 - J. $20\frac{1}{16}$
 - K. 33

Key Facts

Radicals in Denominator

17. $\frac{1}{\sqrt{5}-2} = ?$

- A. $\sqrt{5} - 2$
- B. $\sqrt{5} + 2$
- C. $\frac{\sqrt{5} + 2}{9}$
- D. $\sqrt{5}$
- E. 5

Equation of a Straight Line

18. What is the slope of the line with equation $4x + 5y + 2 = 3$?

- F. $-\frac{5}{4}$
- G. $-\frac{4}{5}$
- H. $\frac{4}{5}$
- J. 1
- K. $\frac{5}{4}$

19. What is the slope of the straight line that passes through (6, 5) and (2, -2) in the standard xy plane?

- A. $-\frac{7}{4}$
- B. $\frac{3}{4}$
- C. $\frac{4}{7}$
- D. $\frac{4}{3}$
- E. $\frac{7}{4}$

Distance between two points

20. What is the distance between the points A (-2, -4) and B (1, 0) in the standard xy plane?

- F. $\sqrt{16}$
- G. $\sqrt{17}$
- H. 5
- J. 20
- K. 25

Key Facts

Parabolas, circles, and ellipses

21. Which of the following is the graph of the equation $y = x^2 + 3$?

*Complicated Equations*

22. For all x not equal to -2 , which of the following is equal to $\frac{(2x^2 + 6x + 4)}{2(x + 2)}$?

F. x

G. $x + 1$

H. $x + 2$

J. $2(x + 1)$

K. $2(x + 2)$

23. Which of the following is equal to $\frac{(4a^{10}b^2)}{(a^5b^{-1})}$?

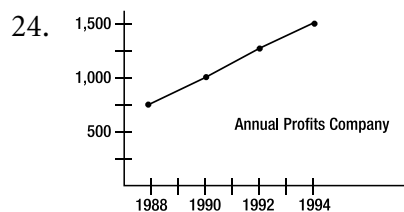
A. $4a^2b^3$

B. $4a^5b$

C. $4a^5b^3$

D. $4a^{15}b$

E. $4a^{15}b^3$

Graph Interpretation

Given the graph above, what will the annual profits for company x be in 1996?

F. 1,500

G. 1,750

H. 2,000

J. 2,250

K. 2,500

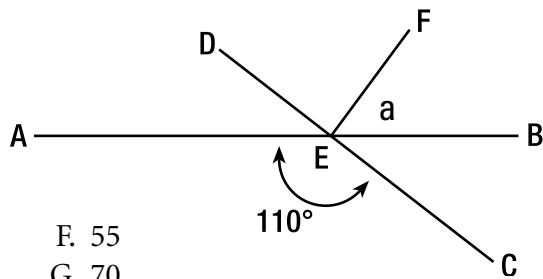
Ratios

25. The \$10,000 prize money at a tennis tournament is to be divided among the top three finishers, in the ratio of 5:3:2, in the order, first place, second place, and third place, respectively. How much money does the second place finisher receive?
- A. 1000
 - B. 2000
 - C. 3000
 - D. 5000
 - E. 8000

Plane Geometry and Trigonometry

Straight Lines

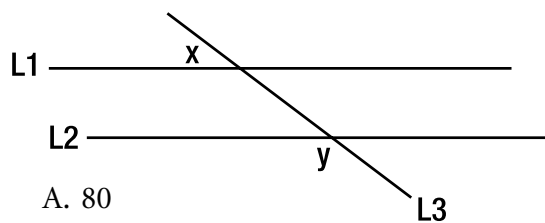
26. Lines AB and CD intersect at point E. Line EF bisects angle DEB. What is the measure of angle a?



- F. 55
- G. 70
- H. 90
- J. 110
- K. 20

Parallel Lines

27. Lines 1 and 2 are parallel to each other, and line 3 intersects line 1 and 2. If $y = 80^\circ$, what is the measure of angle x?

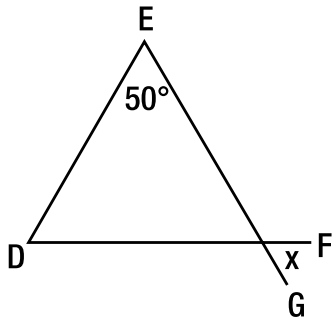


- A. 80
- B. 90
- C. 100
- D. 120
- E. 150

Key Facts

Triangles

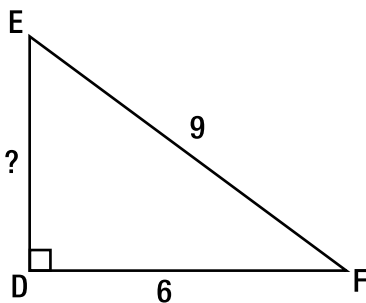
28. Triangle DEF is isosceles with sides DE and EF equal. Points E, F, and G are collinear. What is the measure of angle x?



- F. 40
 - G. 50
 - H. 65
 - J. 70
 - K. 115
29. If the area of a triangle is 24 square units and its altitude is 6, what is its base?
- A. 2
 - B. 8
 - C. 16
 - D. 24
 - E. 72

Right Triangles

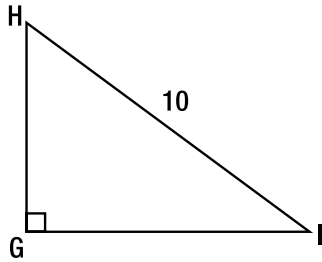
30. In right triangle DEF, $EF = 9$ and $DF = 6$. What is the length of side DE?



- F. 3
- G. $3\sqrt{5}$
- H. $9\sqrt{5}$
- J. $12\sqrt{5}$
- K. $\sqrt{117}$

Key Facts

31. In right triangle GHI, $GH = GI$, and $HI = 10$.
What is the area of triangle GHI?



- A. $\frac{5\sqrt{2}}{2}$
- B. $5\sqrt{2}$
- C. 20
- D. 25
- E. 50

Rectangles and Squares

32. What is the area of a rectangle with length = 10 and perimeter = 32?

- F. 32
- G. 40
- H. 60
- J. 110
- K. 120

Circles

33. If the circumference of a circle is 20, how long is its radius?

- A. $\frac{10}{\pi}$
- B. $\frac{20}{\pi}$
- C. $\frac{2\sqrt{5}}{\pi}$
- D. 10
- E. 20

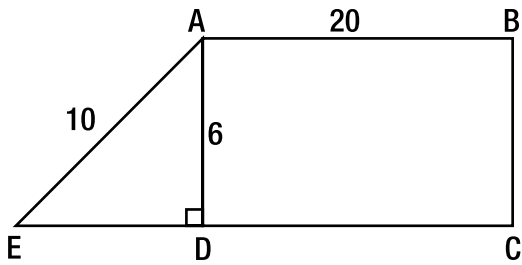
34. If arc AB is 30° and has length = 4, what is the circumference of the circle?

- F. 8π
- G. 16π
- H. 8
- J. 24
- K. 48

Key Facts

Triangle + Rectangle or Square

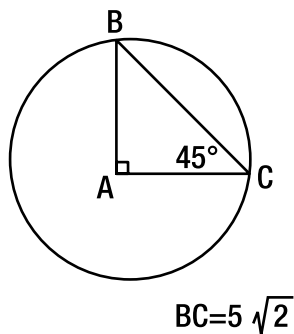
35. In the figure given, AB and CD are parallel and the lengths are represented in units. What is the area of figure ABCE?



- A. 96
- B. 120
- C. 144
- D. 150
- E. 170

Triangle + Circle

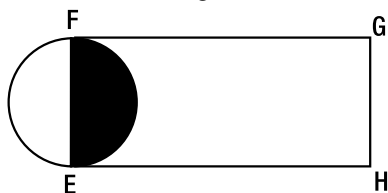
36. Triangle ABC is within circle A, with angles and lengths as given in the figure. What is the area of the circle?



- F. $5\sqrt{2}\pi$
- G. 10π
- H. $20\sqrt{2}\pi$
- J. 25π
- K. 50π

Circle + Rectangle or Square

37. Square EFGH has area =36. What is the area of the shaded semicircular region?

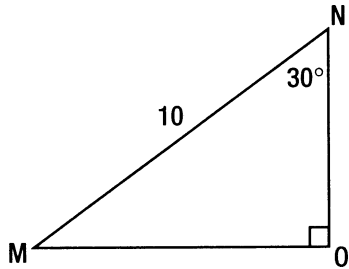


- A. $\frac{9\pi}{2}$
- B. 9π
- C. 18π
- D. 36π
- E. 72π

Key Facts

Trigonometry

38. In the right triangle shown below, the length of MN is 10, angle N measures 30° , $\sin 30^\circ = .50$, $\cos 30^\circ = .866$, and $\tan 30^\circ = 2.89$. Approximately, what is the length of NO, to the nearest hundredth?



- F. 5.00
G. 7.00
H. 8.50
J. 8.66
K. 22.89
39. What is $\sin B$ if $\cos B = \frac{18}{30}$ and $\tan B = \frac{24}{18}$?
- A. $\frac{18}{30}$
B. $\frac{18}{24}$
C. $\frac{24}{30}$
D. 1
E. $\frac{24}{18}$

Key Facts