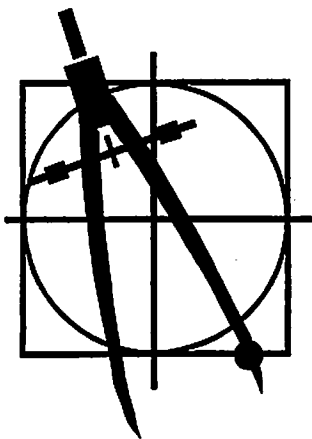




Math Department Final Exam Math 115

**Do NOT write in booklet.
Do all work on scratch paper. Put
answers on scantron. NO CELL
PHONES ALLOWED.**

Good Luck

Version A

TEST#: _____

Math115CommonFinal f2011 mgr

Directions: **DO NOT WRITE ON THIS EXAM.** USE THE SCRATCH PAPER PROVIDED. Translate your answers to the SCANTRON form for all problems 1-40 Good luck! You have exactly 2 hours to complete this exam. Be sure to turn in ALL scratch paper along with this exam. You may use a scientific calculator. **NO CELL PHONES ALLOWED!**

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) There are 4590 independent banking firms. If this represents 18% of all banking firms, what is the total number of banking firms? Round to the nearest whole number. 1) _____
- A) 826 B) 82,600 C) 25,500 D) 255

Simplify the expression.

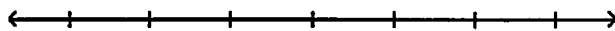
- 2) $(7z + 12) - (2z - 8)$ 2) _____
- A) $5z + 20$ B) $5z + 4$ C) $5z - 20$ D) $9z + 20$

Solve the equation.

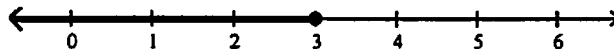
- 3) $2x + 7(2x - 6) = -17 - 9x$ 3) _____
- A) 1 B) $-\frac{59}{25}$ C) -1 D) $-\frac{59}{7}$

Solve the inequality. Graph the solution set.

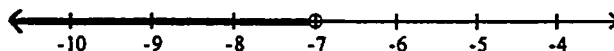
- 4) $-7x - 2 \geq -8x + 1$ 4) _____



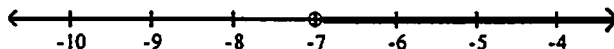
A) $\{x \mid x \leq 3\}$



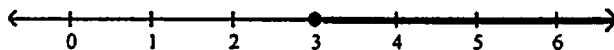
B) $\{x \mid x < -7\}$



C) $\{x \mid x > -7\}$



D) $\{x \mid x \geq 3\}$



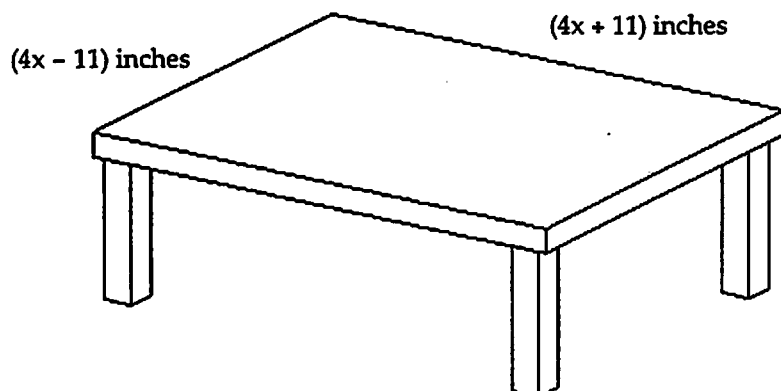
Multiply.

- 5) $(5x - 6)^2$ 5) _____
- A) $5x^2 - 60x + 36$ B) $25x^2 - 60x + 36$ C) $25x^2 + 36$ D) $5x^2 + 36$

Solve.

- 6) The top of a table is $4x - 11$ inches by $4x + 11$ inches. Express the area of the top of the table as a product, then multiply and simplify.

6) _____



- A) $(16x^2 + 88x - 121)$ sq in.
C) $(16x^2 - 121)$ sq in.

- B) $(16x^2 - 88x - 121)$ sq in.
D) $(x^2 - 121)$ sq in.

Divide.

7) $\frac{5x^2 + 2xy - 9x}{10xy}$

7) _____

A) $\frac{x}{2y} + \frac{1}{5y} - \frac{9}{10}$

B) $\frac{x}{2y} + \frac{1}{5} - \frac{9}{10y}$

C) $\frac{1}{2y} + \frac{1}{5} - \frac{9x}{10y}$

D) $\frac{x}{2y} + 5 - \frac{9}{10y}$

Solve the problem.

- 8) How many liters of a 30% alcohol solution must be mixed with 80 liters of a 90% solution to get a 60% solution?

8) _____

A) 160 L

B) 8 L

C) 80 L

D) 16 L

- 9) From a point on a straight road, John and Fred ride bicycles in opposite directions. John rides 9 miles per hour and Fred rides 14 miles per hour. In how many hours will they be 92 miles apart?

9) _____

A) 5 hours

B) Not enough information

C) 4 hours

D) 3 hours

Write the slope-intercept form of the equation for the line passing through the given pair of points.

- 10) (6, 0) and (4, 7)

10) _____

A) $y = \frac{7}{2}x + 21$

B) $y = -\frac{7}{2}x + 21$

C) $y = -2x + 15$

D) $y = 2x + 15$

Write the number using scientific notation.

- 11) The earth is approximately 92,900,000 miles from the sun.

11) _____

A) 9.29×10^6

B) 9.29×10^8

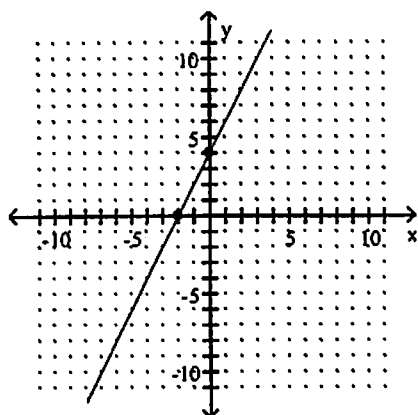
C) 9.29×10^{-7}

D) 9.29×10^7

Use the coordinates of the indicated points to find the slope of the line.

12)

12) _____



A) 2

B) $\frac{1}{2}$

C) -2

D) $-\frac{1}{2}$

Solve by the substitution method.

13) $x + 7y = 27$

13) _____

$4x + 6y = 20$

A) $\{(-1, 4)\}$

B) $\{(1, 5)\}$

C) $\{(-2, 5)\}$

D) $\emptyset$

Solve.

- 14) Gene runs a charity fruit sale, selling boxes of oranges for \$11 and boxes of grapefruit for \$10. If he sold a total of 762 boxes and his total income was \$8125, then how many boxes of oranges did he sell?

14) _____

A) 257 boxes

B) 383 boxes

C) 505 boxes

D) 458 boxes

Write a system of equations for the problem, and then solve the system.

- 15) A boat travels 36 miles downstream in 4 hours and returns upstream in 6 hours. Find the rate of the speed of the current and the speed of the boat in still water if x = the speed of the boat in still water and y = speed of the current.

15) _____

	r	t	d
Downstream	$x + y$	4	$4(x + y)$
Upstream	$x - y$	6	

A) Boat: 1.5 mph; current: 7.5 mph

B) Boat: 7.5 mph; current: 1.5 mph

C) Boat: 16.5 mph; current: 9 mph

D) Boat: 9 mph; current: 1.5 mph

Simplify. Assume that x and y are nonzero.

16) $\frac{(2x^2y)^4(xy^4)^4}{(xy)^3}$

16) _____

A) $16x^9y^{17}$

B) $2x^9y^{17}$

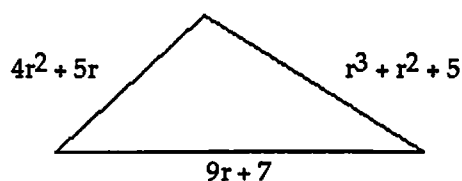
C) $2x^{12}y^{20}$

D) $16x^5y^{17}$

Provide an appropriate response.

17) Find a polynomial that represents the perimeter.

17) _____



A) $5r^3 + r^2 + 14r + 12$

B) $r^3 + 5r^2 + 14r + 12$

C) $5r^3 + 15r + 12$

D) $r^3 + 4r^2 + 15r + 12$

Perform the division.

18) $(p^2 + 4p - 26) \div (p + 8)$

18) _____

A) $p - 4 + \frac{6}{p+8}$

B) $p + 4 + \frac{6}{p+8}$

C) $p - 4$

D) $p - 6 + \frac{4}{p+8}$

Factor out the GCF from the polynomial.

19) $16m^9 - 36m^6 - 28m^4$

19) _____

A) $m^4(16m^5 - 36m^2 - 28)$

B) GCF is 1

C) $4m^4(4m^5 - 9m^2 - 7)$

D) $4(4m^9 - 9m^6 - 7m^4)$

Factor completely. If the polynomial is nonfactorable, say so.

20) $x^2 + 64$

20) _____

A) $(x + 8)(x - 8)$

B) $(x + 8)^2$

C) $(x - 8)^2$

D) nonfactorable

21) $x^4 - 1$

21) _____

A) $(x^2 + 1)(x + 1)(x - 1)$

B) nonfactorable

C) $(x + 1)^2(x - 1)^2$

D) $(x^2 - 1)(x + 1)(x - 1)$

Factor completely.

22) $18x^2 - 78x - 60$

22) _____

A) $(18x + 12)(x - 5)$

B) $6(3x + 2)(x - 5)$

C) $6(3x - 2)(x + 5)$

D) nonfactorable

Solve the problem.

23) A lot is in the shape of a right triangle. The shorter leg measures 150 meters. The hypotenuse is 50 meters longer than the length of the longer leg. How long is the longer leg?

23) _____

A) 200 m

B) 150 m

C) 250 m

D) 300 m

Write the rational expression in lowest terms.

24) $\frac{y^2 + 5y - 36}{y^2 + 2y - 63}$

24) _____

A) $\frac{y - 4}{y - 7}$

B) $\frac{5y - 36}{2y - 63}$

C) $-\frac{y^2 + 5y - 36}{y^2 + 2y - 63}$

D) $\frac{5y - 4}{2y - 7}$

Multiply or divide. Write the answer in lowest terms.

25) $\frac{x^2 + 6x + 9}{x^2 - 25} \cdot \frac{x + 5}{x + 3}$

25) _____

A) $\frac{x + 3}{x + 5}$

B) $\frac{x + 3}{(x - 5)^2}$

C) $\frac{x + 3}{x - 5}$

D) $\frac{x - 3}{x - 5}$

Add or subtract. Write the answer in lowest terms.

26) $\frac{6}{3x - 2} - \frac{5}{2 - 3x}$

26) _____

A) $\frac{-1}{3x - 2}$

B) $\frac{11}{3x - 2}$

C) $\frac{-11}{3x - 2}$

D) $\frac{1}{3x - 2}$

27) $\frac{x}{x^2 - 16} - \frac{8}{x^2 + 5x + 4}$

27) _____

A) $\frac{x^2 - 7x + 32}{(x - 4)(x + 4)}$

B) $\frac{x^2 + 7x + 32}{(x - 4)(x + 4)(x + 1)}$

C) $\frac{x^2 - 7x + 32}{(x - 4)(x + 4)(x + 1)}$

D) $\frac{x^2 - 7}{(x - 4)(x + 4)(x + 1)}$

Solve the problem.

28) One printer can do a printing job in 2 hr. Another printer can do the same job in 14 hr. How long does it take the two printers to do the job working together?

28) _____

A) $2\frac{1}{3}$ hr

B) $\frac{1}{16}$ hr

C) $1\frac{3}{4}$ hr

D) $1\frac{11}{17}$ hr

Solve.

29) $\frac{2}{x} = \frac{x}{5x - 12}$

29) _____

A) $\{0, 12\}$

B) $\{0, 36\}$

C) $\{4, 6\}$

D) $\emptyset$

Solve the equation.

30) $5r^2 - 39r - 8 = 0$

30) _____

A) $\{-5, 8\}$

B) $\left\{-\frac{1}{5}, 5\right\}$

C) $\left\{\frac{1}{39}, -\frac{1}{5}\right\}$

D) $\left\{-\frac{1}{5}, 8\right\}$

Solve the equation. Express radicals in simplest form.

31) $2n^2 - 56 = 0$

31) _____

A) $\{\pm 4\sqrt{7}\}$

B) $\{7\sqrt{2}\}$

C) $\{\pm 2\sqrt{7}\}$

D) $\{4\sqrt{7}\}$

Solve the quadratic equation by completing the square or by using the quadratic formula.

32) $2x^2 + 10x + 7 = 0$

32) _____

A) $\left\{\frac{-10 \pm \sqrt{11}}{2}\right\}$

B) $\left\{\frac{-5 \pm \sqrt{11}}{2}\right\}$

C) $\left\{\frac{-5 \pm \sqrt{39}}{2}\right\}$

D) $\left\{\frac{-5 \pm \sqrt{11}}{4}\right\}$

If necessary, write the equation in the standard form $ax^2 + bx + c = 0$. Then identify the values of a , b , and c . Do not actually solve the equation.

33) $(x - 4)^2 = 2$

A) $a = -1$, $b = 8$, $c = -14$

C) $a = 1$, $b = 4$, $c = 16$

B) $a = -4$, $b = -8$, $c = 18$

D) $a = 1$, $b = -8$, $c = 14$

33) _____

Simplify. Assume that all variables represent nonnegative numbers.

34) $\sqrt{24x^2y}$

A) $2x^2\sqrt{6y}$

B) $2xy\sqrt{6}$

C) $2xy^2\sqrt{6}$

D) $2x\sqrt{6y}$

34) _____

Add or subtract by first simplifying each radical and then combining any like radicals. Assume that all variables represent positive numbers.

35) $\sqrt{3a} + 3\sqrt{12a} - 6\sqrt{75a}$

A) $-23\sqrt{90a}$

B) $-3\sqrt{90a}$

C) $-23\sqrt{3a}$

D) $-3\sqrt{3a}$

35) _____

Solve the problem.

36) Find the area of a rectangle whose length is $9\sqrt{5}$ meters and width is $4\sqrt{35}$ meters.

A) $900\sqrt{7}$ sq. m

B) $180\sqrt{35}$ sq. m

C) $36\sqrt{175}$ sq. m

D) $180\sqrt{7}$ sq. m

36) _____

Divide and simplify. Assume that all variables represent positive real numbers.

37) $\frac{\sqrt{90x^9}}{\sqrt{5x^7}}$

A) $x\sqrt{18}$

B) $3x\sqrt{10}$

C) $3x\sqrt{2}$

D) $3x^8\sqrt{2}$

37) _____

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

38) $\frac{7}{\sqrt{37} - 6}$

A) $7\sqrt{37} - 6$

B) $7\sqrt{37} + 42$

C) $\frac{7\sqrt{37} + 42}{74}$

D) $7\sqrt{37} - 42$

38) _____

Solve the problem.

39) The time T in seconds for a pendulum of length L feet to make one swing is given by $T = 2\pi\sqrt{\frac{L}{36}}$.

How long is a pendulum (to nearest hundredth) if it makes one swing in 1.1 seconds? Use 3.14 for π .

A) 43.56

B) 1.1

C) 6.94

D) 10.89

39) _____

Find the y -intercept and any x -intercepts of the parabola.

40) $y = x^2 - 5x - 24$

A) y -intercept $(0, 24)$, x -intercepts $(8, 0)$ and $(-3, 0)$

B) y -intercept $(-24, 0)$, x -intercepts $(0, 8)$ and $(0, -3)$

C) y -intercept $(0, -24)$, x -intercepts $(-8, 0)$ and $(3, 0)$

D) y -intercept $(0, -24)$, x -intercepts $(8, 0)$ and $(-3, 0)$

40) _____