Name: _____   **Date:** _____

1. A botany student is studying the genetic relationship between four different plant species. Samples of their DNA are analyzed with gel electrophoresis. The test results are digitized by a computer program into polynomials.

       Daisy: $2x^2 - x - 15$ Wheat: $6x^2 - 7x - 3$

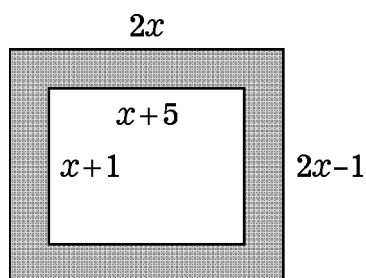   Grass: $8x^2 - 21x + 9$ Strawberry: $6x^2 + 7x - 20$

   a) Factor the computerized polynomials below.

     Daisy: _____   Wheat: _____

     Grass: _____   Strawberry: _____

   b) Common factors indicate species that are closely related. Which plants are closely related?

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2. Find the area of the shaded region shown in the picture.

   A. $3x^2 - 8x - 5$ B. $3x^2 - 5x + 8$

   C. $3x^2 - 5x - 8$ D. $3x^2 + 8x + 5$

3. The simplest form of $(3x-7)(4x+1)-(5x+2)(x-6)$ is a trinomial with three positive single-digit coefficients. Identify their sum.

   A.   11   B.   13   C.   15   D.   17

4. How many of the following statements are true?

    • $x - 1$ is a factor of $2x^{10} - x^7 - 1$.

    • The remainder for $(2x^{10} - x^7 - 1) \div (x - 1)$ is 0.

    • If $P(x) = 2x^{10} - x^7 - 1$ then $P(1) = 0$.

   A.   2   B.   3   C.   0

   D.   cannot be determined

5. When $2x^2 + x + c$ is divided by $x + k$, the quotient is $2x - 5$ and the remainder is 8. Find c and k.

   A. $k = 7, c = -7$ B. $k = 13, c = 1$

   C. $k = 3, c = -7$ D. $k = -5, c = 3$

6. $\dfrac{n^2 - r^2}{r^2 + nr} = \dfrac{n}{r} - \square$

    A. 1   B. r C. $\dfrac{r}{n}$ D. nr

7. Subtract and simplify: $\dfrac{x+4}{x^2 + 3x - 10} - \dfrac{x-4}{x^2 - 6x + 8}$

    A. $-\dfrac{1}{x^2 + 3x - 10}$ B. $-\dfrac{1}{x^2 - 3x - 8}$

    C. $-\dfrac{2x}{2x^2 - 3x - 2}$ D. $-\dfrac{x^2 - 16}{x+5} x - 2$

8. Express in simplest form:

$$\dfrac{6h^2 + 7h - 3}{4h^3 - 9h} \div \dfrac{2h + 5}{6h^2 - 9h}$$

9. Express as a single fraction in simplest form:

$$1 + \dfrac{1}{\dfrac{1}{x-1} - 1}$$

10. Simplify: $\dfrac{\dfrac{2x+6}{x+1}}{\dfrac{x+3}{x^2 - 1}}$

    A. $2(x+1)$ B. $2(x-1)$

    C. $\dfrac{2(x+3)^2}{(x+1)^2(x-1)}$ D. $x+1$

11. In May, 1999, the population of a small town was 42,386 and was increasing at a rate of 0.9% per year. In what year will the town's population reach 50,000 at the same rate of growth?

    A. 2009   B. 2010   C. 2016   D. 2017

12. The pH of a solution measures how alkaline or acidic it is. It is defined as

$$\text{pH} = -\log_{10}(\text{Hydrogen Ion Concentration})$$

where the Hydrogen Ion Concentration is in moles per liter.

    a) What is the pH of a acid rain if its hydrogen ion concentration is 3.0×10^{-5}?

    b) What is the hydrogen ion concentration of a lake if its pH = 4.7?

13. A barely audible sound has a decibel level of 0 and is denoted by I_0. If I equals the intensity of a sound then the decibel level is

$$10 \log_{10} \left(\frac{I}{I_0} \right)$$

a) If a plane at takeoff has a decibel level of about 110, what would the decibel level be if two planes were taking off simultaneously?

b) What would the decibel level be if there were three planes simultaneously taking off at 110 decibels?

14. The amount of money A after t years that a principal amount P will amount to if it is invested at rate r compounded n times a year is given by the relationship

$$A(t) = P \left(1 + \frac{r}{n} \right)^{nt}$$

where r is expressed as a decimal.

To 1 decimal place, how long with it take:

a) $2500 to become $4500 if it is invested at 7% and is compounded quarterly?

b) $3600 to become $5200 if it is invested at 9% and is compounded semi-annually?

c) a sum of money to double if it is invested at 12% and compounded annually?

d) a sum of money to double if it is invested at 12% and compounded semi-annually?

15. Heron's formula, $A = \sqrt{s(s-a)(s-b)(s-c)}$, allows us to find the area of a triangle from the lengths, a, b, and c, of its sides, where s is half its perimeter. Use this formula to show that the area of a triangle having sides of length 6, 8, and 10 is rational.

16. $$N = \frac{31}{\pi} \cdot \sqrt{\frac{17}{3r}}$$ where $\pi \approx 3.14$ and

$N =$ number of rotations per minute to simulate earth's gravity

$r =$ radius of the space station

To one decimal place, find:

a) the number of rotations per minute if the radius is 39 meters.

b) the radius of the space station if it is to rotate 5.6 times per minute.

c) in general, the length of the radius if you want to triple the number of rotations.

17. Solve for x given $2x\sqrt{18} - \sqrt{8} = \sqrt{50} + 4x\sqrt{32}$.

18. Solve for x: $\sqrt{x^2 + 3x} = x + 3$

19. Solve: $\dfrac{2(x-7)}{x^2 + 3x - 28} + \dfrac{x-2}{x-4} = \dfrac{x+3}{x+7}$

20. Unless otherwise directed, answers to this question may be left in terms of π.

    a) Convert $\frac{4\pi}{3}$ radians into degrees.

    b) Convert $495°$ into radians.

    c) A bike wheel rotates $\frac{3\pi}{2}$ radians. If a spoke on that wheel is 28 centimeters long, find how far the outer end moves.

    d) The bike wheel rotates 90 revolutions per minute. What is the angle in radians through which the wheel rotates per second?

21. Convert to radian measure. Answer to 2 decimal places.

    a) $-84°$

    b) $119°$

    c) $32°$

22. Convert to radian measure. Answer in terms of π where necessary.

    a) $-150°$

    b) $225°$

    c) $45°$

    d) $\left(\frac{25}{\pi}\right)°$

23. Find the number of radians in a central angle of a circle whose radius is 5 inches if the central angle intercepts an arc 14 inches long.

24. In a circle a central angle intercepts an arc equal in length to the diameter of the circle. How many radians are there in this central angle?

25. A fly lands on the edge of a record. The record has a radius of 3 inches and is making 45 revolutions per minute. How far, to the nearest inch, does the fly travel in 15 seconds?

    A. 45 in   B. 106 in   C. 135 in   D. 212 in

Review Assignment   03/22/2016

1.
Answer: Daisy: $(2x + 5)(x − 3)$, Wheat: $(3x + 1)(2x − 3)$, Grass: $(4x − 3)(2x − 3)$, Strawberry: $(2x + 5)(3x − 4)$; Daisy and Strawberry, Wheat and Grass
Objective: A.SSE.3A

2.
Answer: A
Objective: A.APR.1

3.
Answer: C
Objective: A.APR.1

4.
Answer: B
Objective: A.APR.2

5.
Answer: C
Objective: A.APR.2

6.
Answer: A
Objective: A.APR.6

7.
Answer: A
Objective: A.APR.7

8.
Answer: $\dfrac{3(3h − 1)}{2h + 5}$
Objective: A.APR.7

9.
Answer: $\frac{1}{2−x}$
Objective: A.APR.7

10.
Answer: B
Objective: A.APR.7

11.
Answer: D
Objective: F.LE.4

12.
Answer: 4.5; $H \approx 2.00 \times 10^{-5}$
Objective: F.LE.4

13.
Answer: ≈ 113; ≈ 115
Objective: F.LE.4

14.
Answer: 8.5 years; 4.2 years; 6.1 years; 5.9 years
Objective: F.LE.4

15.
Answer: [answers vary]
Objective: A.REI.2

16.
Answer: 3.8; 17.6 m; $\frac{r}{9}$
Objective: A.REI.2

17.
Answer: $-\frac{7}{10}$
Objective: A.REI.2

18.
Answer: -3
Objective: A.REI.2

19.
Answer: 2
Objective: A.REI.2

20.
Answer: $240°$; $2\frac{3}{4}\pi$; 42π cm; 3π per second
Objective: F.TF.1

21.
Answer: -1.47, 2.08, 0.56
Objective: F.TF.1

22.
Answer: $-\frac{5\pi}{6}$; $\frac{5\pi}{4}$; $\frac{\pi}{4}$; $\frac{5}{36}$
Objective: F.TF.1

23.
Answer: $2\frac{4}{5}$
Objective: G.C.5

24.
Answer: 2
Objective: G.C.5

25.
Answer: D
Objective: G.C.5