1)   Which product(s) is(are) correct?

> I $(2x+5)(3x-8) = 6x^2 - x - 40$
>
> II $\left(x-\frac{2}{3}\right)\left(x+\frac{2}{3}\right) = x^2 - \frac{4}{3}$
>
> III $(2x+3)^2 = 4x^2 + 12x + 9$

     A   I only
     B   I, II, and III
     C   I and II only
     D   I and III only
     E   II and III only

2)   Which is a factor of $2x^2 + 6x + ax + 3a$?

     A $x-3$

     B $2x+a$

     C $2x+3$

     D $2x-a$

     E $x+a$

3)   Which trinomial is prime (cannot be factored)?

     A $x^2 + 5xy + 6y^2$

     B $2y^2 - y - 3$

     C $n^2 + 5n - 50$

     D $a^2 - 5a - 6$

     E $4x^2 + 2x + 1$

4)   Factor the following polynomial completely. $27x^4 - 12x^2$

     A $3x^2(3x-2)^2$

     B $3x^2(3x+2)(3x-2)$

     C $3x^2(3x+4)(3x-1)$

     D $3x^2(9x+1)(x-4)$

     E   None of the above.

5)　　Select the perfect square trinomial.

　　A　　$16 + 4b + b^2$

　　B　　$9x^2 + 40x + 16$

　　C　　$g^2 - 10gh + 25h^2$

　　D　　$4u^2 + 13u + 9$

　　E　　None are perfect square trinomials.

6)　　Solve the following equation. Which choice describes the solution(s)?

$$(y+4)(y-2) = -8$$

　　A　　There are two positive solutions.
　　B　　There are two negative solutions.
　　C　　One solution is zero, the other is positive.
　　D　　One solution is zero, the other is negative.
　　E　　There is only one negative solution.

7)　　A framed painting is 20 inches long and 18 inches wide. There are 192 square inches of the painting that shows through a frame of uniform width. If x represents the uniform width of the frame, which **simplified** equation could be used to solve for x?

　　A　　$x^2 - 38x + 168 = 0$

　　B　　$x^2 + 38x + 168 = 0$

　　C　　$x^2 - 19x + 42 = 0$

　　D　　$x^2 + 19x + 42 = 0$

　　E　　$x^2 - 19x - 42 = 0$
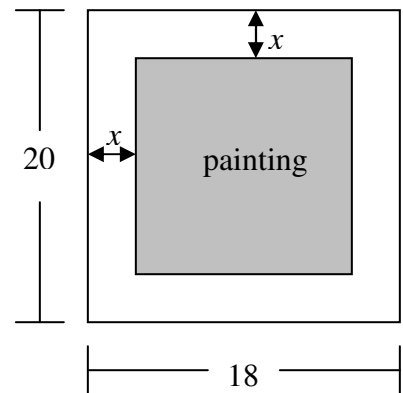
8)   Multiply and simplify: $\dfrac{2x^2+3x}{x^2} \cdot \dfrac{x^2-16}{2x^2+11x+12}$

    A $\dfrac{x-4}{x}$

    B $\dfrac{x-4}{x^2}$

    C $\dfrac{-48x}{11x+12}$

    D $\dfrac{x(x+4)}{x^2}$

    E $\dfrac{(2x+3)^2}{x(x-4)}$

9)   Add the two rational expressions below. Simplify if possible.

$$\frac{2}{x}+\frac{3}{x+1}$$

    A $\dfrac{7}{x+1}$

    B $\dfrac{5x+1}{x(x+1)}$

    C $\dfrac{5}{x(x+1)}$

    D $\dfrac{2x+5}{x(x+1)}$

    E $\dfrac{5x+2}{x(x+1)}$

10)   What would be the lowest common denominator that would be used to add these
        rational expressions? Do not actually complete the addition. Examine the
        choices carefully.

$$\frac{1}{n^2-4}+\frac{3}{n^2+2n}+\frac{n+2}{n^2-4n+4}$$

A $n(n+2)(n-2)^2$

B $n(n+2)^2(n-2)^3$

C $n(n+2)(n-2)$

D $n(n+2)^2(n-2)^2$

E $n(n+2)^2(n-2)$

11)   Solve the following equation. Which statement describes the solution?

$$\frac{3}{x-3}-\frac{1}{2}=\frac{13}{2x-6}$$

A   The solution is less than -9.
B   The solution is at least -9, but less than -4.
C   The solution is at least -4, but less than 0.
D   The solution is at least 0, but less than 6.
E   The solution is 6 or greater.

12)   Joe and Julie work in a CSI lab. It takes Julie twice as long as Joe to complete a
        certain lab test because Julie is a less experienced technician. If they work
        together on the lab test, they complete the test in 2 hours. How long does it take
        Julie alone to complete the lab test?

A   10 hours
B   5 hours
C   6 hours
D   4 hours
E   7 hours

13) Misty is a rower for her university team. During one practice she rowed at her constant speed (as in still water) upriver for 3 miles against a 1 mile per hour current. She then turned around and rowed at the same pace for the **same time** going downriver for 5 miles. If x represents Misty's constant speed (without current), which equation could be used to find that speed?

	Distance	Rate	Time
Upriver	3		
Downriver	5		

$A \quad \dfrac{3}{x-1} + \dfrac{5}{x+1} = 1$

$B \quad \dfrac{3}{x-1} = \dfrac{5}{x+1}$

$C \quad \dfrac{3}{x+1} = \dfrac{5}{x-1}$

$D \quad 3(x-1) = 5(x+1)$

$E \quad \dfrac{3}{1-x} = \dfrac{5}{1+x}$

14) The value of y varies directly as the **square of x**. If y is 75 when $x = 5$, use a variation equation to find the value of y when $x = \dfrac{4}{3}$.

$A \quad y = 4$

$B \quad y = 16$

$C \quad y = \dfrac{400}{9}$

$D \quad y = \dfrac{16}{3}$

$E \quad$ None of the above.

15) Which radical is **not** simplified correctly? (Assume variables represent positive values.)

$A \quad -\sqrt{121} = -11$

$B \quad \sqrt{0.0049} = 0.7$

$C \quad \sqrt[3]{-64} = -4$

$D \quad \sqrt[4]{(4m)^4} = 4m$

$E \quad \sqrt[3]{125x^6} = 5x^2$