1. Given that $x < 0$, $y > 0$, and $z < 0$, which of the following values must be positive?

A. $\dfrac{x}{y}$

B. $\dfrac{xy}{z}$

C. yz

D. $\dfrac{x^2yz}{|z|}$

E. More than one is positive

2. Simplify. Do not leave negative exponents in your answer.

$$\frac{(3x^{-4})(-2x^{6})}{12x^{-9}}$$

A. $-\dfrac{1}{2x^7}$

B. $-8x^{11}$

C. $-\dfrac{1}{2x^{15}}$

D. $\dfrac{x^{11}}{8x^4}$

E. $-\dfrac{x^{11}}{2}$

3. Simplify. Do not leave negative exponents in your answer.

$$(-4x^{0}y^{-3}z^{6})^{2}$$

A. $\dfrac{x^2z^8}{16y}$

B. $\dfrac{16z^{12}}{y^6}$

C $-\dfrac{4x^2z^8}{y}$

D. $-\dfrac{8z^{12}}{y^6}$

E. None of the above

4. Simplify completely.

$$\left(\sqrt{15x^5y^7}\right)\left(\sqrt{5x^3y^5}\right)$$

A. $5x^4y^6\left(\sqrt{3}\right)$

B. $2x^7y^{17}\left(\sqrt{5xy}\right)$

C. $2x^4y^6\left(\sqrt{5xy}\right)$

D. $2x^4y^6\left(\sqrt{5}\right)$

E. $5x^7y^{17}\left(\sqrt{3xy}\right)$

5. Divide and express as a polynomial.

$$\frac{8a^6b^2-16a^{12}b^7+12a^6b^6}{4a^3b}$$

A. $8a^3b^2-4a^7b^7+12a^6b^6$

B. $2a^2b^2-4a^4b^7+3a^2b^6$

C. $a^{21}b^{14}$

D. $2a^3b-4a^9b^6+3a^3b^5$

E. $2a^3b-16a^{12}b^7+12a^6b^6$

6. Multiply and express as a polynomial.

$$(5x-3)(2x+7)$$

A. $10x^2-21$

B. $10x^2+7x+21$

C. $10x^2-29x+21$

D. $10x^2+41x-21$

E. None of the above

7. Which of the following is a factor of $16y^4-81$?

A. $4y-3$

B. $2y-9$

C. $4y+9$

D. $2y+9$

E. $2y+3$

8. Simplify completely.

$$\frac{x+2}{2x^2+7x+6} \div \frac{x^2-4}{6x^2+7x-3}$$

A. $\dfrac{3x-1}{(x-2)^2}$

B. $\dfrac{3x-2}{(x+2)(x-2)}$

C. $\dfrac{3x-2}{x-2}$

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

E. None of the above

9. Rationalize the denominator and simplify.

$$\frac{\sqrt{m}-5}{\sqrt{m}+3}$$

A. $\dfrac{m-15}{m+9}$

B. $\dfrac{m-25}{m+9}$

C. $\dfrac{m-8\sqrt{m}+15}{m-9}$

D. $\dfrac{m+15}{m-9}$

E. $\dfrac{m-2\sqrt{m}-15}{m+3}$

10. Solve for x. Simplify your answer.

$$x^2-6x-11=0$$

A. $x=3\pm 2\sqrt{5}$

B. $x=3\pm 4\sqrt{5}$

C. $x=3\pm\sqrt{2}$

D. $x=3\pm 6\sqrt{11}$

E. $x=3\pm 2\sqrt{2}$

11. Solve the following equation. Choose the answer that best describes the solution(s).

$$\frac{7}{6(x+3)}+\frac{5}{6(x-3)}=\frac{2x-1}{x^2-9}$$

A. There is only one solution.
It is between 1 and 2.

B. There is only one solution.
It is $x=0$.

C. There is only one solution.
It is between 0 and 1.

D. There is no solution.

E. All real numbers are solutions
except $x=\pm 3$.

12. Solve $W=\frac{3n+p}{n}$ for n.

A. $n=\frac{p}{W-3}$

B. $n=\frac{3+p}{W}$

C. $n=\frac{W+3}{p}$

D. $n=\frac{3W+p}{W}$

E. $n=\frac{W-3}{p}$

13. A workman has a basic hourly wage and earns time and a half (his hourly wage plus another half of that wage) for hours worked in excess of 40. His paycheck for one week was \$750 and he worked a total of 48 hours that week. If x represents the basic hourly wage, write an equation that would be used to find x. Do not solve.

A. $x+\frac{3}{2}x=750$

B. $x+\frac{3}{2}(48-x)=750$

C. $40x+8\left(\frac{3}{2}x\right)=750$

D. $40x+4x=750$

E. $40x+60(48-x)=750$

14. A boat travels at a constant rate of 8 miles per hour in still water. It travels upstream for $\frac{3}{4}$ of an hour. It then turns around and travels downstream, returning to the starting point, in $\frac{1}{2}$ of an hour. Find the rate of the current.

A. $\frac{8}{5}$ mph

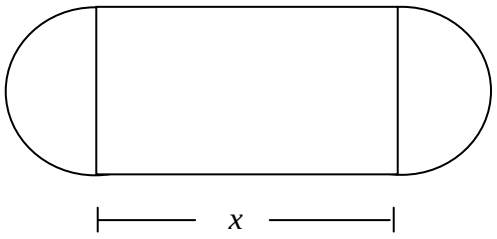
B. $\frac{5}{4}$ mph

C. $\frac{3}{2}$ mph

D. 10 mph

E. None of the above

15. A conference table is to be constructed in the shape of a rectangle with two equal-sized semicircles on either end (see the figure). Let x represent the length of the rectangle. The radius of each semicircle is $\frac{7}{2}$ feet and the total area of the table is to be 110 square feet. Find the equation that would be used to find x. Simplify the equation. Do not solve the equation.



A. $\frac{7}{2}x + 49\pi = 110$

B. $7x + 49\pi = 110$

C. $\frac{7}{2}x + \frac{49}{4}\pi = 110$

D. $7x + \frac{49}{4}\pi = 110$

E. $7x + \frac{49}{8}\pi = 110$