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ALGEBRA REVIEW DOSSIER

Solve all exercises.

1. Perform the indicated operations and simplify:

(a) $-5(7-2)+6(-1)^3-7(-6+4)^2-6-(5-8)$

(b) $6x\left(-7+x^2\right)+(-3x)(x+1)^2-3(x+1)(x-1)+(x^2+2)^2$

(c) $\left(-\frac{1}{3}\right)+3\left(\frac{2}{4}-\frac{1}{2}\right)^2-\frac{3}{5}\left(\frac{2}{4}\div\frac{3}{5}\right)+\frac{7}{6}\left(-\frac{1}{2}\right)^3$

(d) $3(-7)+\left(-\frac{1}{6}\right)\left(\frac{9}{2}\right)-\left(\frac{2}{3}-\frac{4}{2}\right)+4(-3)^3+\left(\frac{1}{2}\div\frac{2}{3}\right)$

(e) $4x^2\left(x^2+3\right)-5x(x+1)^3+2x-4+3x^2$

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2. Factor completely:

(a) $2x^2 - 6x - 8$ =

(b) $x^2 + 7x + 10$ =

(c) $x^3 + 9x^2 - 10x$ =

(d) $3x^2 - 2x - 1$ =

(e) $4x^3 - 20x^2 - 24x$ =

3. Factor and simplify:

(a) $\dfrac{x^2 - x - 2}{2x^3 + 4x^2 - 6x} \cdot \dfrac{x^2 + 4x - 5}{x^2 - 1} \div \dfrac{x^2 + 3x - 10}{3x^2 + 18x + 27}$ =

(b) $\dfrac{x^2+3x-4}{x^2-3x+2}\cdot\dfrac{3x^3-12x}{2x^2+2x}\div\dfrac{9x^2-36}{x^2-x-2}$

4. Simplify:

(a) $\left(\dfrac{16x^3y^2z^{-3}}{100x^2y^{-2}z^{-4}}\right)^{-3}$

(b) $\left(\dfrac{80x^{-1}y^{-3}z^4}{5x^{-2}y^5z^{-4}}\right)^{1/2}$

(c) $\sqrt[3]{2x^5y}\sqrt[3]{16x^2y^2}$

(d) $\sqrt{2x}(\sqrt{8x}-\sqrt{3})$

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5. Rewrite the following expressions without using the absolute value symbol and simplify:

   (a) $|-3|+|8|\cdot|-3-2|-|3|+4|-1|-|-2|$ =

   (b) $|x-3|$ if $x<-3$

   (c) $|x+4|$ if $x>-4$

   (d) $|x+5|$ if $x<-5$

   (e) $|2x-1|$ if $x<0$

6. Find the simplest radical form:

   (a) $\dfrac{x-4}{\sqrt{x}-2}$

   (b) $\dfrac{2x}{\sqrt{x}-2}$

   (c) $\dfrac{x-1}{\sqrt{3x}+1}$

   (d) $\sqrt[9]{x^3}$

   (e) $\sqrt[10]{4x^2}$

   (f) $\sqrt[3]{\dfrac{240xy}{12xy^4z}}$

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Solve the following equations:

(a) $-3(1-3x)+3(-x-2)=-3x-5x$

x =

(b) $\frac{-12}{3}(4x+3)+4(6x+1)+3x=-2x+43+5x$

x =

(c) $-4x^2+400=0$

x =

(d) $x^2-11=67$

x =

(e) $2x^2-3x-5=0$

x =

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(f) $8x^2+7-15=-7$

x =

(g) $8x^2+4+4x=20-x^2$

x =

(h) $x-\sqrt{2+2x}=3x$

x =

(i) $\sqrt{2x}=x-1$

x =

(j) $\sqrt{4x+1}-\sqrt{2x+4}=1$

x =

(k) $\dfrac{4x}{x+1}-\dfrac{3}{x-1}=\dfrac{3x+3}{x^2-1}$

x =

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(l) $\frac{2x}{x-1} = \frac{1}{3x-3}$

x =

8. Solve the following inequalities:

(a) $\frac{2x+7}{5} > \frac{5x-3}{2}$

Ans:

(b) $\frac{1}{2} \leq \frac{5x-6}{4}$

Ans:

(c) $\frac{1}{2} \leq \frac{5x-6}{4} < 7$

Ans:

(d) $5x > \frac{x+3}{2}$

Ans:

(e) $-6x+4 \leq 2x+1 \leq 8x+4$

Ans:

(f) $2x \leq 3x+4 < 4x-2$

Ans:

(g) $8x \geq 2x+2-3x \geq 2-4x$

Ans: