

70 pts

For the problems below, put your answer in the box. Do not show any work (e.g., intermediate forms) in the box. Instead, show work below the boxes. You do not have to show any work for the problems that do not indicate "Show Work!". For those, you may use an automated system such as a graphing calculator or software. E.g., I encourage you to try Wolfram Alpha (wolframalpha.com).

Write each fraction in lowest terms.

5 pts

5 pts

(1) $\frac{36i^6}{63i} = \frac{4}{7} i^5$	(2) $\frac{21c^6}{56c^2} = \frac{3}{8} c^4$	(3) $\frac{-25g^3 + 300g^2}{75g^2 - 900g} = \frac{-g}{3}$
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5 pts

Show work!

$$\frac{36i^6}{63i} = \frac{9 \cdot 4 i \cdot i^5}{9 \cdot 7 i} = \frac{4i^5}{7}$$

Show work!

$$\frac{21c^6}{56c^2} = \frac{7 \cdot 3 \cdot c^2 \cdot c^4}{7 \cdot 8 \cdot c^2} = \frac{3c^4}{8}$$

$$\begin{aligned} \frac{-25g^3 + 300g^2}{75g^2 - 900g} &= \frac{25g^2(-g + 12g)}{75g^2 - 900g} \\ &= \frac{25g^2(-g + 12g)}{75g^2 - 900g} = \frac{-g(g-12g)}{3(g-12g)} \\ &= \frac{-g(g-12g)}{3(g-12g)} = \frac{-g}{3} \end{aligned}$$

Write each fraction in lowest terms.

5 pts

5 pts

(4) $\frac{24g^3}{16g^2} = \frac{3}{2} g$	(5) $\frac{40h}{80h^6} = \frac{1}{2h^5}$ or $\frac{h^{-5}}{2}$	(6) $\frac{-7c^4y^4 - 7c^2y}{-56c^3y^3} = \frac{1+c^2y^3}{8cy^2}$
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5 pts

Show work!

$$\frac{24g^3}{16g^2} = \frac{8 \cdot 3 \cdot g^2 \cdot g}{8 \cdot 2 \cdot g^2} = \frac{3}{2} g$$

Show work!

$$\frac{40h}{80h^6} = \frac{40 \cdot h}{40 \cdot 2 \cdot h \cdot h^5} = \frac{1}{2h^5}$$

$$\begin{aligned} \frac{-7c^4y^4 - 7c^2y}{-56c^3y^3} &= \frac{c^2(-c^2y^4 - y)}{-8c^3y^3} \\ &= \frac{c^2(-c^2y^4 - y)}{-8c^3y^3} = \frac{c^2y^3 - 1}{-8cy^2} \end{aligned}$$

Multiply.

5 pts

(7) $(4x)(-8x-9) = -32x^2 - 36x$	(8) $5x(-6x-3) = -30x^2 - 15x$
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5 pts

Show work!

$$\begin{aligned} (4x)(-8x-9) &= \\ 4x(-8x) - 4x(-9) &= \\ = 4 \cdot (-8) x \cdot x - 4(-9)x &= \\ = -32x^2 + 36x & \end{aligned}$$

Show work!

$$\begin{aligned} 5x(-6x-3) &= 5(-6)x \cdot x - (5x)(-3) \\ &= -30x^2 - 15x \end{aligned}$$

5 pts

(9) $(11x)(-5x^3 + 8x^2 + 9x + 8)$
Show work!

$$\begin{aligned} & (11x)(-5x^3 + 8x^2 + 9x + 8) = \\ & = (-5 \cdot 11)(x \cdot x^3) + 8 \cdot 11 \cdot x \cdot x^2 + \quad (\text{Too big!}) \\ & \quad + 9 \cdot 11 \cdot x \cdot x + 11 \cdot x \cdot 8 = \\ & = \boxed{-55x^4 + 88x^3 + 99x^2 + 88x} \end{aligned}$$

(10) $-9x(-3x^2 + 9x + 11) = 27x^3 - 81x^2 - 99x$
Show work!

$$\begin{aligned} & -9x(-3x^2 + 9x + 11) = \\ & = (-9x)(-3x^2) + (-9x)(9x) + \\ & \quad + (-9x) \cdot 11 \\ & = 27x^3 + (-81x^2) + (-99x) \\ & = 27x^3 - 81x^2 - 99x \end{aligned}$$

5 pts

Simplify (and show work below each box):

5 pts

(11) $\sqrt{36x^4}$ (assume $x \geq 0$)
 = $6x^2$

$$\begin{aligned} & \sqrt{36x^4} = (36x^4)^{\frac{1}{2}} \\ & = (6^2 \cdot x^4)^{\frac{1}{2}} = \\ & = 6^{2 \cdot \frac{1}{2}} \cdot x^{4 \cdot \frac{1}{2}} = 6 \cdot x^2 \end{aligned}$$

(12) $\sqrt[9]{9x}$
 = $9^{\frac{1}{9}x}$

$$\begin{aligned} & \sqrt[9]{9x} = (9x)^{\frac{1}{9}} \\ & = 9^{x \cdot \frac{1}{9}} = 9^{\frac{1}{9}x} \end{aligned}$$

5 pts

5 pts

(13) assume $(b > 0)$
 $\frac{10b^2c^2}{c^3\sqrt[3]{8b^4}} = 5cb^{\frac{2}{3}}$

$$\begin{aligned} & \frac{10b^2c^2}{c^3\sqrt[3]{8b^4}} = \\ & \frac{\cancel{c} (10b^2c)}{\cancel{c} (8b^4)^{\frac{1}{3}}} = \frac{10b^2c}{(8^{\frac{1}{3}})(b^{\frac{4}{3}})} \\ & = \frac{b \cdot 10cb}{(2^{3 \cdot \frac{1}{3}}) b^{\frac{4}{3}}} = \\ & = \frac{\cancel{b} \cdot 10 \cdot \cancel{c} b}{2 \cdot \cancel{b} \cdot b^{\frac{1}{3}}} = \frac{5cb}{b^{\frac{1}{3}}} = 5 \cdot c b^{(1 - \frac{1}{3})} = 5cb^{\frac{2}{3}} = 5c\sqrt[3]{b^2} \end{aligned}$$

(14)
 $\sqrt[4]{81x^8y^3} = 3x^2y^{\frac{3}{4}}$

$$\begin{aligned} & \sqrt[4]{81x^8y^3} = 81^{\frac{1}{4}} \cdot x^{8 \cdot \frac{1}{4}} \cdot y^{3 \cdot \frac{1}{4}} = \\ & = (3 \cdot 3 \cdot 3 \cdot 3)^{\frac{1}{4}} \cdot x^2 \cdot y^{\frac{3}{4}} = \\ & = 3^{4 \cdot \frac{1}{4}} \cdot x^2 \cdot y^{\frac{3}{4}} = 3x^2y^{\frac{3}{4}} \\ & \text{or } 3x^2\sqrt[4]{y^3} \end{aligned}$$

5 pts (assuming $x, y \geq 0$)