

Warm Up

Monday Sept. 25

Write each of the following with only Positive Exponents

a) a^{-2} $\frac{1}{a^2}$

d) $3xy^2z^3$

$\frac{3xy^2}{z^3}$

b) $a^{-4}b^3c^{-2} = \frac{b^3}{a^4c^2}$

e) $\frac{4a^{-2}b^3c}{2a^3b^1c^8}$

c) $4c^{-4}$

$= \frac{4}{c^4}$

$2a^{-2-3}b^{3-1}c^{1-8}$

$2a^{-5}b^2c^{-7}$

f) $\frac{6a^4c^2}{3b^{-3}}$

$2a^4c^2b^3$

$\frac{2b^2}{a^5c^7}$

Test Review Sheet

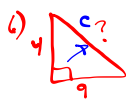
1) $\sqrt[3]{\frac{125}{8}} = \frac{\sqrt[3]{125}}{\sqrt[3]{8}} = \frac{5}{2}$

2) $\sqrt[3]{100}$ $\sqrt[4]{16}$ $\sqrt[3]{130}$ $\sqrt{81}$
 $\sqrt[3]{64} \sqrt[3]{125}$ \downarrow $\sqrt[3]{125}$ $\sqrt[3]{216}$ $\sqrt[3]{81}$ $\sqrt[3]{100}$
 \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow
 4 No 5 No 5 Yes 6 No 9 No 10 No

3) $\sqrt{50}$, $\sqrt[3]{-125}$, $\sqrt{4.9}$, $\sqrt{\frac{81}{36}}$
 Not in perfect square list, so irrational
 $= -5$ Rational
 $= \frac{\sqrt{49}}{\sqrt{10}}$ ← can't so irrational
 $= \frac{\sqrt{81}}{\sqrt{36}} = \frac{9}{6}$ Rational

4) $\sqrt{28}$, $\sqrt[3]{40}$, $\sqrt[5]{301}$, $\sqrt[3]{-83}$
 5.2915 , 3.419 , 3.1310 , -4.36 least

- 5) a) integer but not whole? any negative (Ex -1)
 ±1, ±2, ±3
 b) is a whole but not integer? 0
 0, 1, 2, 3
 c) whole but not natural? 0
 0, 1, 2, 3, 4

6)  $c^2 = a^2 + b^2$
 $= 4^2 + 9^2$
 $= 16 + 81$
 $c^2 = 97$
 $c = \sqrt{97}$

7) $\sqrt[3]{648}$ ← look in perfect cube list
 $\sqrt[3]{216 \times 3}$
 $\sqrt[3]{216} \sqrt[3]{3}$
 6 $\sqrt[3]{3}$

8) $\sqrt{605}$ ← look in perfect square list
 $\sqrt{121 \times 5}$
 $11 \sqrt{5}$
 find largest perfect square that divides into 605

9) a) $4\sqrt[3]{7}$
 $\sqrt[3]{4^3 \times 7}$
 $\sqrt[3]{64 \times 7}$
 $= \sqrt[3]{448}$

b) $5\sqrt{10}$
 $= \sqrt{5^2 \times 10}$
 $= \sqrt{25 \times 10}$
 $= \sqrt{250}$

10) $71^{3/4} = (\sqrt[4]{71})^3$ Remember $x^{m/n} = \sqrt[n]{x^m}$

11) a) $(\sqrt[3]{6})^2 = 6^{2/3}$ b) $(\sqrt[5]{11})^3 = 11^{3/5}$ c) $(\sqrt[3]{\frac{1}{9}})^2 = (\frac{1}{9})^{2/3}$ d) $\sqrt[5]{\frac{5}{6}} = (\frac{5}{6})^{1/5}$

Review for test Sheet continued

12) $8.4^{0.75}$ as radical: $8.4^{\frac{3}{4}}$ b) $7.5^{1.25} = (7.5)^{\frac{5}{4}}$ change 1.25 to fraction
 $8.4^{\frac{3}{4}} = \sqrt[4]{(8.4)^3}$ or $(\sqrt[4]{8.4})^3$
 $7.5^{\frac{5}{4}} = (\sqrt[4]{7.5})^5$ or $\sqrt[4]{(7.5)^5}$

13) Evaluate $(\frac{343}{216})^{\frac{2}{3}}$ b) $(\frac{1024}{1600})^{-\frac{3}{5}}$ minus flip
 $= \frac{(\sqrt[3]{343})^2}{(\sqrt[3]{216})^2} = \frac{(\sqrt[3]{16807})^{\frac{2}{3}}}{(\sqrt[3]{1024})^{\frac{2}{3}}}$
 $= \frac{7^2}{6^2} = \frac{49}{36}$ $= \frac{7^2}{4^2} = \frac{49}{16}$
 a) $125^{-\frac{2}{5}} = (\frac{1}{125})^{\frac{2}{5}} = (\sqrt[5]{1})^2 = \frac{1}{(\sqrt[5]{125})^2} = \frac{1}{125^{\frac{2}{5}}}$

14) $\frac{1}{9} = \frac{1}{3^2} = 3^{-2}$ a)

15) $[(-3x^4y^3)(7xy)]^{-2}$ simplify inside bracket first since like terms
 $(-21x^5y^4)^{-2}$
 $= (-21)^{-2} (x^5)^{-2} (y^4)^{-2}$ power of power
 $= \frac{1}{(-21)^2 x^{10} y^8}$ make all neg exponents to bottom
 $= \frac{1}{441 x^{10} y^8}$

b) $(\frac{x^3y^3z}{x^4y^2z})^2$ simplify inside bracket first
 $(\frac{x^{-1}y^1z^1}{x^4y^2z})^2$ this 1 is not needed
 $(x^{-4}y^0z^0)^2$ power law
 $= x^{-8}y^0z^0$ make neg power to bottom
 $= \frac{y^0z^0}{x^8}$

c) $(\frac{3x^4}{z^2})^{-5}$ nothing simplify in bracket so flip
 $(\frac{z^2}{3x^4})^5 = \frac{z^{10}}{3^5 x^{20}} = \frac{z^{10}}{243 x^{20}}$
 OR $(\frac{3x^4}{z^2})^{-5} = \frac{3^{-5} x^{-20}}{z^{-10}} = \frac{z^{10}}{3^5 x^{20}}$ more negative exponent to opposite top/bottom

d) $\frac{(4xy^2)(3x^2y^3)^4}{12x^4y^3}$
 $= \frac{4xy^2 \cdot 3^4 x^8 y^{12}}{12x^4y^3}$
 $= \frac{4(3^4) x x^8 y^2 y^{12}}{12 x^4 y^3}$
 $= \frac{4(81) x^9 y^{14}}{12 x^4 y^3}$
 $= \frac{81}{3} x^{9-4} y^{14-3}$
 $= 27 x^5 y^{11}$
 $= 27 x^{13} y^{31}$
 $[xyz]^0 = 1$

e) $(\frac{3}{4} a^{-1} b^2)^{-2}$
 $= (\frac{3 a^{-1} b^2}{4})^{-2}$
 $= \frac{4^2}{3^2 a^{-2} b^4}$
 $= \frac{16 a^2}{9 b^4}$

Homework

20/ 20 MC
 4 Short Response
 4 1) ab) Entin → Mix
 4 2) ab) Mix → Entin
 8 3) abcdef Simplifi

5 + 0 = 42 pts

Page 242-243

9(b,d,f,h), #10(b,d), 11, 15(a,b,c,d),
 16(a,b,c,d), 17(a,) 19(a), 21(a,)
 #22(a,)



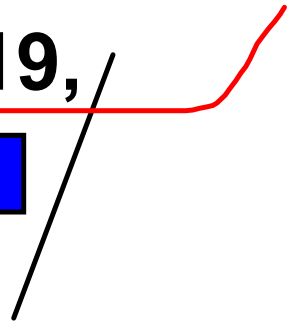
Test Review

Page 246-248

Questions

3,6,7,11,12,14,17,18,19,

TOMORROW →



Page 242-243

Homework Questions

9(b,d,f,h), #10(b,d), 11, 15(a,b,c,d),

16(a,b,c,d), 17(a), 19(a), 21(a),

#22(a).

$$\begin{aligned}
 9) b) & a^{-4} \cdot a^{-1} \\
 & = a^{(-4)+(-1)} \\
 & = a^{-5} \\
 & = \frac{1}{a^5}
 \end{aligned}$$

$$\begin{aligned}
 9f) & \frac{s^5}{s^5} \text{ or } s^5 \cdot s^{-5} \\
 & = s^{5-(5)} \\
 & = s^0
 \end{aligned}$$

$$\begin{aligned}
 10b) & \left(\frac{3}{4}\right)^{\frac{3}{4}} \cdot \left(\frac{3}{4}\right)^{\frac{5}{4}} \\
 & = \left(\frac{3}{4}\right)^{\frac{3}{4} + \frac{5}{4}} \\
 & = \left(\frac{3}{4}\right)^{\frac{8}{4}} \\
 & = \left(\frac{3}{4}\right)^2 \\
 & = \frac{3^2}{4^2} \\
 & = \frac{9}{16}
 \end{aligned}$$

$$\begin{aligned}
 11) a) & (x^{-1} y^{-2})^{-3} \\
 & = x^{(-1)(-3)} y^{(-2)(-3)} \\
 & = x^3 \cdot y^6
 \end{aligned}$$

$$\begin{aligned}
 11c) & (4m^2 n^3)^{-3} \\
 & = 4^{-3} m^{2(-3)} n^{3(-3)} \\
 & = \frac{1}{4^3} \cdot m^{-6} n^{-9} \\
 & = \frac{1}{64 m^6 n^9}
 \end{aligned}$$

$$\begin{aligned}
 9d) & m^8 \cdot m^{-2} \cdot m^{-6} \\
 & = m^{8+(-2)+(-6)} \\
 & = m^0 \\
 & = 1
 \end{aligned}$$

$$\begin{aligned}
 h) & \frac{t^{-4}}{t^4} \\
 & = t^{-4-(4)} \\
 & = t^{-4+4} \\
 & = t^0 \\
 & = 1
 \end{aligned}$$

$$\begin{aligned}
 10d) & \left(\frac{4}{5}\right)^{\frac{4}{3}} \cdot \left(\frac{4}{5}\right)^{-\frac{4}{3}} \\
 & = \left(\frac{4}{5}\right)^{\frac{4}{3} + (-\frac{4}{3})} \\
 & = \left(\frac{4}{5}\right)^0 \\
 & = 1
 \end{aligned}$$

$$\begin{aligned}
 b) & (2a^{-2} b^2)^{-2} \\
 & = 2^{-2} a^{(-2)(-2)} b^{2(-2)} \\
 & = \frac{1}{2^2} a^4 b^{-2} \\
 & = \frac{1}{4} \frac{a^4}{b^2} \\
 & = \frac{a^4}{4b^2}
 \end{aligned}$$

$$\begin{aligned}
 d) & \left(\frac{3}{2} m^2 n^3\right)^4 \\
 & = \left(\frac{3}{2}\right)^4 m^{2(4)} n^{3(4)} \\
 & = \left(\frac{3}{2}\right)^4 m^8 n^{12} \\
 & = \frac{2^4}{3^4} m^8 n^{12} \\
 & = \frac{16 m^8 n^{12}}{81}
 \end{aligned}$$

$$\begin{aligned}
 15) a) & (a^3 b^4)(a^2 b^3) \\
 & = a^3 \cdot a^2 \cdot b^4 \cdot b^3 \\
 & = a^{3+2} \cdot b^{4+3} \\
 & = a^5 b^7
 \end{aligned}$$

$$\begin{aligned}
 b) & (a^{-1} b^{-2})(a^{-2} b^3) \\
 & a^{-1} \cdot a^{-2} \cdot b^{-2} \cdot b^3 \\
 & a^{-1+(-2)} \cdot b^{-2+3} \\
 & a^{-3} \cdot b^{-5} \\
 & = \frac{1}{a^3 b^5}
 \end{aligned}$$

$$\begin{aligned}
 15c) & \frac{a^{-4} b^5}{a b^3} \\
 & = a^{-4-1} b^{5-3} \\
 & = a^{-5} b^2 \\
 & = \frac{b^2}{a^5}
 \end{aligned}$$

$$\begin{aligned}
 d) & \left(\frac{a^{-7} b^7}{a^9 b^{10}} \right)^{-5} \\
 & = \left(a^{-7-(+9)} \cdot b^{7-10} \right)^5 \\
 & = \left(a^{-16} \cdot b^{-3} \right)^5 \\
 & = a^{-2(5)} \cdot b^{-3(5)} \\
 & = a^{-10} b^{-15} \\
 & = \frac{a^{10}}{b^{15}}
 \end{aligned}$$

$$\begin{aligned}
 16a) & m^{\frac{2}{3}} \cdot m^{\frac{4}{3}} \\
 & = m^{\frac{2}{3} + \frac{4}{3}} \\
 & = m^{\frac{6}{3}} \\
 & = m^2
 \end{aligned}$$

$$\begin{aligned}
 b) & x^{\frac{3}{2}} \div x^{\frac{1}{4}} \\
 & = x^{\frac{3}{2} - (\frac{1}{4})} \\
 & \quad \text{add opp need common denom} \\
 & = x^{\frac{6}{4} + \frac{1}{4}} \\
 & = x^{\frac{7}{4}} \\
 & = x^{\frac{1}{2}} \\
 & = \frac{1}{x^{\frac{1}{2}}}
 \end{aligned}$$

$$\begin{aligned}
 16c) & \frac{-9 a^{-4} b^{\frac{3}{4}}}{3 a^2 b^{\frac{1}{4}}} \\
 & = \frac{-9}{3} a^{-4-2} b^{\frac{3}{4}-\frac{1}{4}} \\
 & = -3 a^{-6} b^{\frac{2}{4}} \\
 & = \frac{-3 b^{\frac{1}{2}}}{a^6}
 \end{aligned}$$

$$\begin{aligned}
 d) & \left(\frac{-64 c^6}{a^9 b^{\frac{1}{3}}} \right)^{\frac{1}{3}} \\
 & = \frac{(-64)^{\frac{1}{3}} c^{\frac{6}{3}}}{a^{\frac{9}{3}} b^{(\frac{1}{3} \cdot \frac{1}{3})}} \\
 & = \frac{-4 c^2}{a^3 b^{\frac{1}{9}}} \\
 & = \frac{-4 c^2}{a^3 b^{\frac{1}{6}}}
 \end{aligned}$$

17a 18a 21a 22a

$$17a) (x^2 y^{-3})(x^{\frac{1}{2}} y^{-1}) = x^2 \cdot x^{\frac{1}{2}} \cdot y^{-3} \cdot y^{-1}$$

correct way

$$= x^{2+\frac{1}{2}} \cdot y^{(-3)+(-1)}$$

$$= x^{\frac{5}{2}} \cdot y^{-4}$$

Wrong
 $x^2 \cdot x^{\frac{1}{2}} \cdot y^{-3} \cdot y^{-1}$
 $= x^1 \cdot y^3$
 $= x y^3$

didn't add but they multiply exponents

$$= x^2 \cdot x^{\frac{1}{2}} \cdot y^{-3} \cdot y^{-1}$$

$$= x^{\frac{5}{2}} \cdot y^{-4}$$

19a) $\frac{(m^{-3} n^2)^4}{(m^1 n^{-3})^2} = \frac{m^{-3 \times 4} n^{2 \times 4}}{m^{2 \times 1} n^{-3 \times 2}}$ ← *Correct method*

didn't apply a power to a power first

$$= \frac{m^{-12} n^8}{m^2 n^{-6}}$$

$$= m^{-12-4} n^{8-(-6)}$$

$$= m^{-16} n^{14}$$

$$= \frac{n^{14}}{m^{16}}$$

21a) $\left(\frac{a^{-3} b}{c^2}\right) \cdot \left(\frac{c^5}{a^4 b^{-3}}\right)^{-1}$

$$= \frac{a^{-3} b}{c^2} \cdot \frac{c^{5 \times -1}}{a^{4 \times -1} b^{-3 \times -1}}$$

$$= \frac{a^{-3} b}{c^2} \cdot \frac{c^{-5}}{a^{-4} b^3}$$

$$= \frac{a^{-3}}{a^4} \cdot \frac{b^1}{b^3} \cdot \frac{c^{-5}}{c^2}$$

$$= a^{-3-4} b^{1-3} c^{-5-2}$$

$$= a^{-7} b^{-2} c^{-7}$$

$$= \frac{a}{b^2 c^7}$$

22a) $(x^{\frac{1}{2}} y^{\frac{2}{3}})^2$

$$= x^{\frac{1}{2} \times 2} y^{\frac{2}{3} \times 2}$$

$$= x^1 y^{\frac{4}{3}}$$

$$= x^1 y^{\frac{4}{3}}$$

Sub in $x = a^{-2}$ $y = a^{\frac{5}{3}}$

$$= a^{-2} \left(a^{\frac{5}{3}}\right)^{\frac{4}{3}}$$

$$= a^{-2} a^{\frac{20}{9}}$$

$$= a^{-\frac{18}{9}} \cdot a^{\frac{20}{9}}$$

$$= a^{-18 + \frac{20}{9}}$$

$$= a^{-\frac{160}{9}}$$

$$= \frac{1}{a^{\frac{160}{9}}}$$

3. Estimate the value of each radical to 1 decimal place. What strategies can you use?

a) $\sqrt{11}$ b) $\sqrt[3]{-12}$ c) $\sqrt[4]{15}$

6. Tell whether each number is rational or irrational. Justify your answers.

- | | | |
|----------------|-------------------|----------------------|
| a) -2 | b) 17 | c) $\sqrt{16}$ |
| d) $\sqrt{32}$ | e) 0.756 | f) $12.\overline{3}$ |
| g) 0 | h) $\sqrt[3]{81}$ | i) π |

7. Determine the approximate side length of a square with area 23 cm^2 . How could you check your answer?

12. Write each mixed radical as an entire radical.

a) $6\sqrt{5}$

b) $3\sqrt{14}$

c) $4\sqrt[3]{3}$

d) $2\sqrt[4]{2}$

14. A student simplified $\sqrt{300}$ as shown:

$$\begin{aligned}\sqrt{300} &= \sqrt{3} \cdot \sqrt{100} \\ &= \sqrt{3} \cdot \sqrt{50} \cdot \sqrt{50} \\ &= \sqrt{3} \cdot \sqrt{2} \cdot \sqrt{25} \cdot \sqrt{2} \cdot \sqrt{25} \\ &= 3 \cdot 5 \cdot \sqrt{2} \cdot 5 \\ &= 75\sqrt{2}\end{aligned}$$

Identify the errors the student made, then write a correct solution.

17. Express each power as a radical.

a) $12^{\frac{1}{4}}$

b) $(-50)^{\frac{5}{3}}$

c) $1.2^{0.5}$

d) $\left(\frac{3}{8}\right)^{\frac{1}{3}}$

18. Express each radical as a power.

a) $\sqrt{1.4}$

b) $\sqrt[3]{13^2}$

c) $(\sqrt[5]{2.5})^4$

d) $\left(\sqrt[4]{\frac{2}{5}}\right)^3$

19. Evaluate each power without using a calculator.

a) $16^{0.25}$

b) $1.44^{\frac{1}{2}}$

c) $(-8)^{\frac{5}{3}}$

d) $\left(\frac{9}{16}\right)^{\frac{3}{2}}$

- 22.** Kleiber's law relates a mammal's metabolic rate while resting, q Calories per day, to its body mass, M kilograms:

$$q = 70M^{\frac{3}{4}}$$

What is the approximate metabolic rate of each animal?

- a) a cow with mass 475 kg
 - b) a mouse with mass 25 g
-

24. Evaluate each power without using a calculator.

a) 2^{-2} b) $\left(\frac{2}{3}\right)^{-3}$ c) $\left(\frac{4}{25}\right)^{-\frac{3}{2}}$

25. Kyle wants to have \$1000 in 3 years. He uses this formula to calculate how much he should invest today in a savings account that pays 3.25% compounded annually: $P = 1000(1.0325)^{-3}$
How much should Kyle invest today?

28. Simplify. Explain your reasoning.

a) $(3m^4n)^2$ b) $\left(\frac{x^2y}{y^{-2}}\right)^{-2}$

c) $(16a^2b^6)^{-\frac{1}{2}}$ d) $\left(\frac{r^3s^{-1}}{s^{-2}r^{-2}}\right)^{-\frac{2}{3}}$

29. Simplify. Show your work.

a) $(a^3b)(a^{-1}b^4)$ b) $\left(x^{\frac{1}{2}}y\right)\left(x^{\frac{3}{2}}y^{-2}\right)$

c) $\frac{a^3}{a^5} \cdot a^{-3}$ d) $\frac{x^2y}{x^{\frac{1}{2}}y^{-2}}$

30. Evaluate.

a) $\left(\frac{3}{2}\right)^{\frac{3}{2}} \cdot \left(\frac{3}{2}\right)^{\frac{1}{2}}$

b) $\frac{(-5.5)^{\frac{2}{3}}}{(-5.5)^{-\frac{4}{3}}}$

c) $\left[\left(-\frac{12}{5}\right)^{\frac{1}{3}}\right]^6$

d) $\frac{0.16^{\frac{3}{4}}}{0.16^{\frac{1}{4}}}$

Assignment

Date _____

Simplify. Your answer should contain only positive exponents.

1) $\frac{2u^3v^3 \cdot (3u^2)^2}{2u^2}$

2) $\frac{(4xy^2)^3}{(4y^3)^4 \cdot 2y^3}$

3) $\frac{(4uv^2)^2}{3u^2v^4 \cdot 3v^2}$

4) $\left(\frac{4a^4b^3}{3a^4b^3 \cdot 4a^3b^4}\right)^3$

5) $\left(\frac{3y^3 \cdot 3x^3y^4}{4x^4y^2}\right)^4$

6) $\left(\frac{3xy^4 \cdot 3x^3y^2}{yx^4}\right)^3$

7) $\frac{2ba^2}{4a(2a^3b^4)^3}$

8) $\frac{(2x^2y^2)^4}{(2x^2 \cdot (yx^2)^3)^2}$

9) $\frac{(m^2n^2)^2}{3m^4n^2 \cdot 2m^3n^2}$

10) $\frac{x^2}{4x^4y^2 \cdot (3x^4y^2)^2}$

11) $\left(\frac{n}{m \cdot 2m^4n^4}\right)^4$

12) $\left(\frac{3x^2y^3 \cdot 4x^3y^2}{3xy^3}\right)^4$

13) $\left(\frac{3x^2y^4 \cdot x^3y^3}{(2x^2y^3)^4}\right)^2$

14) $\left(\frac{2u^4v^3 \cdot 2uv^3}{4u^3}\right)^4$

15) $\frac{3uv^2}{2u^3v^2 \cdot (2v^2)^2}$

16) $\frac{(4y)^3}{4y \cdot 3y^2}$

Answers to Assignment (ID: 1)

4) $\frac{1}{27a^9b^{12}}$
 8) $\frac{4y^2}{x^8}$
 12) $256x^{16}y^8$
 16) $\frac{16}{3}$

3) $\frac{16}{9v^2}$
 7) $\frac{1}{16a^8b^{11}}$
 11) $\frac{1}{16m^{20}n^{12}}$
 15) $\frac{3}{8u^2v^4}$

2) $\frac{x^3}{8y^9}$
 6) $729y^{15}$
 10) $\frac{1}{36x^{10}y^6}$
 14) u^8y^{24}

1) $9u^5v^3$
 5) $\frac{6561y^{20}}{256x^4}$
 9) $\frac{1}{6m^3}$
 13) $\frac{9}{256x^6y^{10}}$

Assignment

Date _____

Simplify. Your answer should contain only positive exponents.

1) $k^3 \cdot 8k^3$

2) $7x^3 \cdot 8x^2$

3) $8x^2 \cdot 8x^2$

4) $6n \cdot 8n^3$

5) $4k^3 \cdot 8k^3$

6) $\frac{5x^4}{8x}$

7) $\frac{8n^3}{5n}$

8) $\frac{2b^4}{b^3}$

9) $\frac{3v^2}{6v^3}$

10) $\frac{5x^4}{2x^4}$

11) $\frac{x^3}{2x^2 \cdot 5x}$

12) $\frac{2p^2 \cdot 5p^3}{6p}$

13) $\frac{4n^3 \cdot 3n^2}{6n}$

14) $\frac{6m^2}{3m^2 \cdot 6m}$

15) $\frac{2r}{4r^2 \cdot 5r^2}$

16) $(2x^4)^2$

17) $(3a)^2$

18) $(5k^4)^3$

19) $(3p)^4$

20) $(3n)^3$

4) $48n^4$
8) $2b$
12) $\frac{5p^4}{3}$
16) $4x^8$
20) $27n^3$

Answers to Assignment (ID: 1)

3) $64x^4$
7) $\frac{8n^2}{5}$
11) $\frac{1}{10}$
15) $\frac{1}{10r^3}$
19) $81p^4$

2) $56x^5$
6) $\frac{5x^3}{8}$
10) $\frac{5}{2}$
14) $\frac{1}{3m}$
18) $125k^{12}$

1) $8k^6$
5) $32k^6$
9) $\frac{1}{2v}$
13) $2n^4$
17) $9a^2$

