HW2

1.4

1) $\dfrac{4^{-1}\cdot 5^2}{2^2\cdot 3^{-2}} = \dfrac{5^2\cdot 3^2}{2^2\cdot 4^1}$

$= \dfrac{25\cdot 9}{4\cdot 4} = \dfrac{225}{16}$

---

2) $\dfrac{3^5\cdot 2^3}{4^2\cdot 3^3} = \dfrac{3^5\cdot 2^3}{3^3\cdot 2^4} = \dfrac{3^2}{2^1} = \dfrac{9}{2}$

---

3) $\dfrac{5^3}{3^{-1}5^2+4^{-1}5^3} = \dfrac{5^3}{5^2\left(\frac{1}{3}+\frac{5}{4}\right)}$

$= \dfrac{5}{\frac{1}{3}+\frac{5}{4}}$

$= \dfrac{5}{\frac{4+15}{12}}$

$= \dfrac{5}{19/12}$

$= 5\cdot\dfrac{12}{19} = \boxed{\dfrac{60}{19}}$

oops, this one is not assigned ∴

4) $\dfrac{2^3}{4^{-1}\cdot 2^2+3^{-1}2^3}$

$= \dfrac{2^3}{\frac{2^2}{4}+\frac{2^3}{3}}$

$= \dfrac{2^3}{1+\frac{8}{3}}$

$= \dfrac{8}{\frac{3+8}{3}}$

$= \dfrac{8}{11/3}$

$= \dfrac{24}{11}$

---

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

$= \dfrac{4^3}{4^2\cdot 3^4} = \dfrac{4}{3^4} = \dfrac{4}{81}$

1.4 #6

$$\left(\frac{x^{-4}}{x^{-7}}\right)^{-2} = \frac{x^{8}}{x^{14}}$$

$$= \frac{1}{x^{6}}$$

---

12) $$\frac{(x^{3}y^{-2})^{6}}{(y^{-5}x^{-2})^{-3}}$$

$$= \frac{x^{18}\,y^{-12}}{y^{15}\,x^{6}}$$

$$= \frac{x^{12}}{y^{15}\cdot y^{12}} = \frac{x^{12}}{y^{27}}$$

---

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

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

$$= \left(\frac{y^{3}-x^{2}}{y^{2}+x^{3}}\right)\left(\frac{x}{y}\right)$$

1.5

1) $\sqrt{144} = \sqrt{12 \cdot 12} = 12$

---

4) $\sqrt{\frac{1}{9}} = \frac{1}{\sqrt{9}} = \frac{1}{3}$

---

5) $\sqrt[5]{-32} = \sqrt[5]{-2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = -2$

---

7) $\sqrt{\frac{4}{49}} = \frac{\sqrt{4}}{\sqrt{49}} = \frac{2}{7}$

---

13) $\left(\frac{16}{9}\right)^{-3/2}$

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

$= \left(\sqrt[2]{\frac{9}{16}}\right)^{3}$

$= \left(\frac{3}{4}\right)^{3} = \frac{27}{64}$

1.5

1) $\sqrt{144} = \sqrt{12 \cdot 12} = 12$

4) $\sqrt{\frac{1}{9}} = \frac{1}{\sqrt{9}} = \frac{1}{3}$

5) $\sqrt[5]{-32} = \sqrt[5]{-2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = -2$

7) $\sqrt{\frac{4}{49}} = \frac{\sqrt{4}}{\sqrt{49}} = \frac{2}{7}$

13) $\left(\frac{16}{9}\right)^{-3/2}$

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

$= \left(\sqrt[2]{\frac{9}{16}}\right)^{3}$

$= \left(\frac{3}{4}\right)^{3} = \frac{27}{64}$

1.6

1) 25% of 200

$= \frac{25}{100} \cdot 200$

$= 50$

---

3) 587 = 45% of what number

$\Rightarrow 587 = \frac{45}{100} \times X$

$X = \frac{587 \cdot 100}{45}$

$= 1304.44\ldots$

---

5) 25% reduction in price

= pay 75% of the original price

sweatshirt → original price : 16.99

$\Rightarrow$ pay $= \frac{75}{100} \cdot 16.99$

$= 12.74$

Computer originally cost 1499

$\Rightarrow$ pay $\frac{75}{100} \cdot 1499 = 1124.25$

---

7) 40% cost reduction = pay 60% of the original cost.

So, 60% of original price = pay

$\Rightarrow 60\% \cdot X = 20.40$

$\frac{60}{100} \cdot X = 20.40$

$X = \frac{20.40 \cdot 100}{60}$

$= 34$