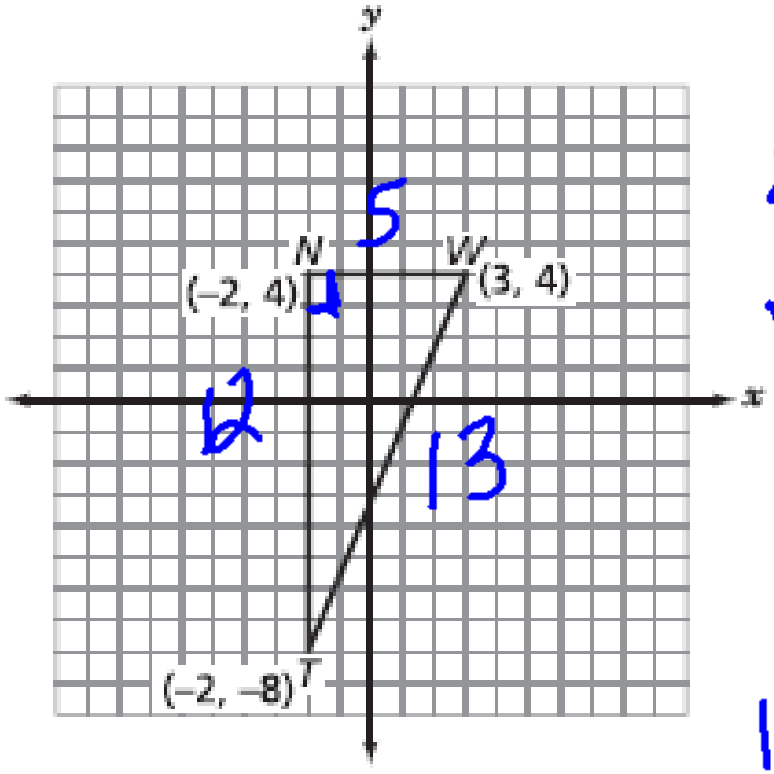
Performance Indicator: Solve problems involving the distance between points or midpoint of a segment.

23 Which value is closest to the perimeter of $\triangle NWT$, in units?



$a^2+b^2=c^2$

$5^2+12^2=c^2$

$25+144=c^2$

$\sqrt{169}=\sqrt{c^2}$

$13=c$

$12+5+13$

A 13
B 17
C 21
D 30

12-4 Multiplying and Dividing Rational Expressions

Objective

I CAN and I WILL divide rational expressions.

12-4 Multiplying and Dividing Rational Expressions

The rules for dividing rational expressions are the same as the rules for dividing fractions. To divide by a rational expression, multiply by its reciprocal.

$\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \cdot \frac{2}{1}$

Dividing Rational Expressions

If a, b, c, and d are nonzero polynomials, then $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$.

12-4 Multiplying and Dividing Rational Expressions

Watch This!

$$\frac{1}{x} \div \frac{x - 2}{2x}$$

$$\frac{1}{x} \cdot \frac{2x}{x-2} = \frac{2}{x-2}$$

12-4 Multiplying and Dividing Rational Expressions

Ex. 1)

$$\frac{2}{g} \div \frac{g+4}{g^2}$$

$$\frac{2}{g} \cdot \frac{g^2}{g+4} = \frac{2g}{g+4}$$

Multiplying and Dividing Rational Expressions

Ex. 2)

$$\frac{3}{x^2} \div \frac{x^3}{(x-5)}$$

12-4 Multiplying and Dividing Rational Expressions

Watch This!

$$\frac{3a^2b}{b} \div \frac{3a^2 + 6a}{1}$$

$$\frac{3a^2b}{b} \cdot \frac{1}{3a^2+6a}$$

$$\frac{3a^2b}{b(3a^2+6a)} = \frac{\cancel{3}a^{\cancel{2}}\cancel{b}}{\cancel{b} \cdot \cancel{3}a(a+2)} = \frac{a}{(a+2)}$$

12-4 Multiplying and Dividing Rational Expressions

Ex. 3)

$$\frac{4xy^2}{y} \div (2x^2 + 6x) = \frac{4xy^2}{y} \cdot \frac{1}{2x^2+6x} =$$

$$\frac{2\cancel{4}\cancel{x}\cancel{y}^{\cancel{2}}}{\cancel{y}} \cdot \frac{1}{\cancel{2}\cancel{x}(x+3)} = \frac{2y}{x+3}$$

12-4 Multiplying and Dividing Rational Expressions

Ex. 3)

$$\frac{18vw^2}{6v} \div \frac{3v^2x^4}{2w^4x}$$

$$\frac{\cancel{3}\,\cancel{18}\cancel{v}w^2}{\cancel{6}\cancel{v}} \cdot \frac{2w^4x}{\cancel{3}v^2x^4} =$$

$$\frac{2w^6x}{v^2x^4} = \frac{2 \cdot w^6 \cdot \cancel{x}}{v^2 \cdot \cancel{x} \cdot x \cdot x \cdot x}$$

$$\frac{2w^6}{v^2x^3}$$

Multiplying and Dividing Rational Expressions

Watch This!

$$\frac{x^2 - 2x}{x} \qquad \frac{2 - x}{x^2 + 2x + 1}$$

Multiplying and Dividing Rational Expressions

Ex. 6) $\dfrac{1-n^2}{n} \div \dfrac{n-1}{n^2-4n}$

$\dfrac{1-n^2}{n} \cdot \dfrac{n^2-4n}{n-1}$

$\dfrac{-1(n-1)(1+n)}{n} \cdot \dfrac{n(n-4)}{n-1} =$

$-1 \cdot (1+n) \cdot (n-4)$

$n - 4 + n^2 - 4n$

$-1(-3n-4+n^2) = 3n+4-n^2$

$-n^2+3n+4$

Example 6: *Application*

Tanya is playing a carnival game. She needs to pick 2 cards out of a deck without looking. The deck has cards with numbers and cards with letters. There are 6 more letter cards than number cards.

a. Write and simplify an expression that represents the probability that Tanya will pick 2 number cards.

Let x = the number cards.

number	+	letter	=	total
x	+	$x + 6$	=	$2x + 6$

Write expressions for the number of each kind of card and for the total number of items.

Example 6 Continued

The probability of picking a letter card and then another letter card is the product of the probabilities of the individual events.

1st pick letter

2nd pick letter

$$P(\text{letter, letter}) = \frac{x}{2x+6} \cdot \frac{x-1}{2x+5}$$

1st pick: total items

2nd pick: total items

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

Example 6 Continued

b. What is the probability that Tanya picks 2 number cards if there are 25 number cards in the deck before her first pick? Round your answer to the nearest hundredth.

Use the probability of picking two number cards. Since x represents the number of number cards, substitute 25 for x.

$$P(\text{number, letter}) = \frac{25(25-1)}{2(25+3)(2\cdot 25+5)}$$

Substitute.

$$= \frac{25(24)}{2(28)(55)} = \frac{600}{3080} \approx 0.19$$

Use the order of operations to simplify.